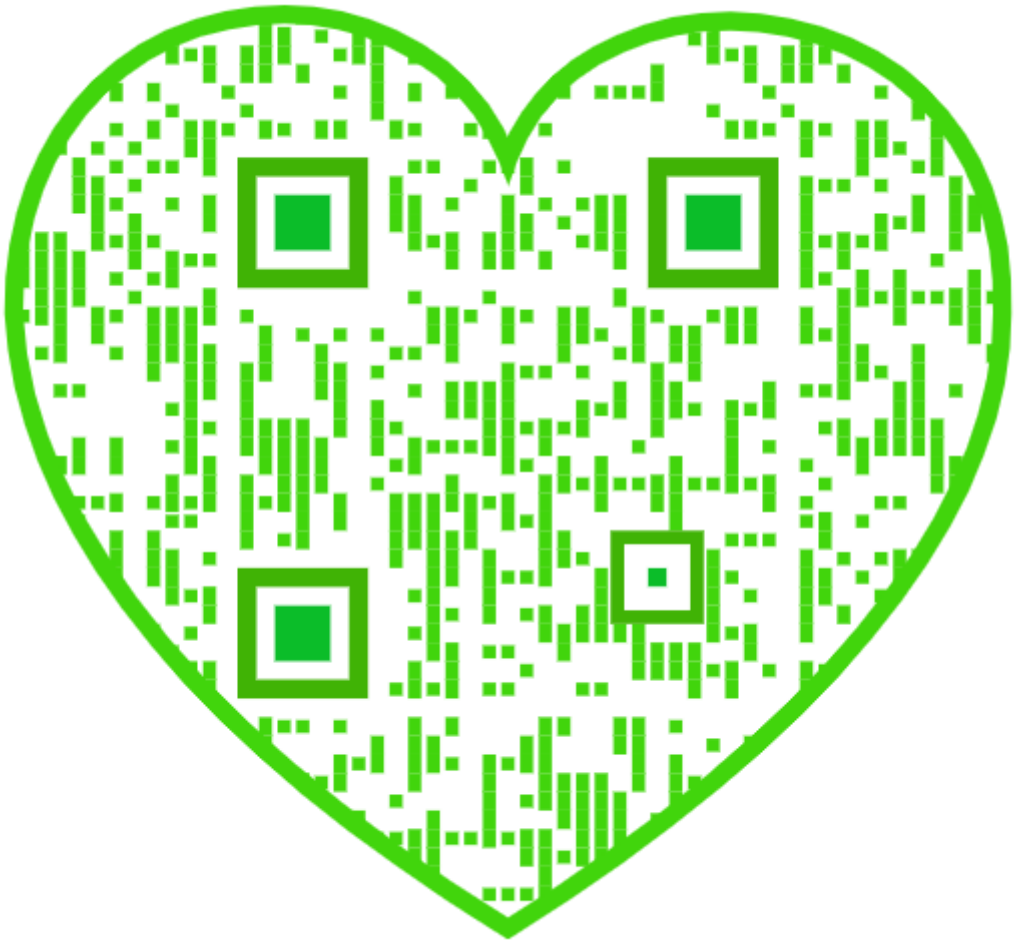

BERGEN'S BOTANY

KEY AND FLORA

NORTHERN AND CENTRAL STATES EDITION

BY

JOSEPH Y. BERGEN, A.M.

INSTRUCTOR IN BIOLOGY, ENGLISH HIGH SCHOOL, BOSTON

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PREFACE

THIS flora furnishes a key to the commoner spring-flowering families of Phanerogams and descriptions of the characteristics of these families, together with such genera and species under each as seem most available for school study in the central and northeastern states. The descriptions have been in part compiled by the author from various sources, and in part written with the plants themselves in hand. The characterizations of many families and of some genera are taken with slight simplifications from Hooker's *Student's Flora of the British Islands;* a few are from Warming's *Systematic Botany.* The remainder are mostly adapted from the floras of Gray and Wood, from Sargent's *Silva of North America,* and from Britton and Brown's illustrated *Flora of the Northern States and Canada.*

The sequence of the families (and sometimes the genera under their respective families) is based on Engler's *Syllabus der Pflanzenfamilien,* which has also been followed as regards nomenclature of families. In other regards the sixth edition of Gray's *Manual,* and Bailey's revision of Gray's *Field, Forest, and Garden Botany* have been followed as authorities. Valuable information concerning the precise time of flowering of many species has been derived from Darlington's *Flora Cestrica* and Ward's *Guide to the Flora of Washington and Vicinity.*

By arrangement with Professor S. M. Tracy a considerable portion of the key and a large number of the following descriptions have been copied (a little simplified) from his *Flora of the Southeastern States;* these are designated by an asterisk at the end of each description.

Especial acknowledgments are due to Professor Benjamin L. Robinson, Director of the Gray Herbarium of Harvard University, who has given most valuable advice and has revised the manuscript of the keys and flora, thus contributing greatly to any value which they may be found to possess.

Much aid has been derived from the careful proof-reading of Professor J. M. Holzinger of the Minnesota State Normal School, Professor L. H. Pammel of the Iowa State College, and Miss Mary P. Anderson of the Somerville, Mass., English High School. The author wishes heartily to thank these critics for the many errors which they have corrected and the valuable additions which they have suggested.

The territory covered overlaps that dealt with by Professor Tracy in the flora above cited, and nearly meets that embraced in Miss Eastwood's *Flora of the Rocky Mountains and the Salt Lake Basin*, since many of the species treated in the present work range west as far as the hundredth meridian.

The plants chosen to constitute this flora are those which bloom during some part of the latter half of the ordinary school year, and which have a rather wide territorial range. Enough forms have been described to afford ample drill in the determination of species. Gray's *Manual of Botany* or *Field, Forest, and Garden Botany* will of course be employed by the student who wishes to become familiar with most of the seed-plants of the region here touched upon. Those species which occur in the central and northeastern United States only as cultivated plants are so designated. The illustrations are mainly redrawn from German sources. A few of them are the work of Mr. E. N. Fischer of Boston, but the greater portion are by Dr. J. W. Folsom of the University of Illinois.

J. Y. B.

CAMBRIDGE, MASS., January, 1901.

HOW TO USE THE KEY AND FLORA

In order to determine an unknown species, the student is first to make a careful examination of the plant in hand. After noting in a general way the appearance of the root, stem, and leaf, including a cross-section of the stem, he should study the number, coherence, and adnation of the parts of the flower, then make and draw a cross-section and a lengthwise section of it. Irregularities in calyx or corolla, peculiarities in the shape, structure, or operation of the essential organs, such, for instance, as anthers discharging through chinks in the end, should be noted.

Next, the inquirer should look carefully through the Key to the families. He is first to decide whether the plant in question is a Gymnosperm or an Angiosperm; if not a coniferous tree or shrub, it will of course belong to the latter division. He is then to settle the question whether it is a Monocotyledon or a Dicotyledon; then under what division of the group the plant comes; and, finally, to decide upon its family.

Turning now to the page at which the family is described, a rapid inspection of the characteristics of the genera will make it evident to which one the species under examination belongs. It may not infrequently prove that none of the genera described agree with the plant studied, and in that case the student must either consult a larger flora or rest satisfied with having determined the family to which his

specimen belongs.[1] The identification of the species, after the genus has been reached, presents no difficulty in a little flora like the present one.

The author does not believe in spending much of the time of a class upon identifying species, but would rather recommend comparative studies of as many plants of a group as are accessible, and making these studies thorough enough to bring out fully the idea of the family, the genus, and the species.[2] The descriptions in this flora may be used as a check on the cruder ones which the pupil is first to frame for himself.

[1] It will greatly simplify matters if the teacher selects for examination only such species as are here described.

[2] The teacher will find abundant suggestions for such a course in Spalding's *Introduction to Botany*, pp. 152-260.

Monocotyledon 3 parts, irregular stem bundles parallel veins in leaf. seed.
Dicotyledon, 4, 5 parts, regular bundles in stem. netted veins. seed.

Family Characteristics.

1 - Plant a shrub, tree or herb.
2 Leaf arrangement and kind.
3 Flower.
a. Apetalous, gamopetalous, Polypetalous
b. Corolla, gamo-poly-petalous, regular or irregular.
c Hypogynous (under); Epigynous (above) perigynous
d. Stamens, number, insertion coalescence
e. Pistil. or many. simple or compound number of cells or ovary. Placentation (arrangement of seeds)

KEY TO THE FAMILIES OF FLOWERING PLANTS DESCRIBED IN THIS FLORA

CLASS I

GYMNOSPERMS. Ovules not enclosed in an ovary.

Trees or shrubs. Leaves usually evergreen and needle-shaped, awl-shaped, or scale-like. Flowers monœcious or dioecious. Fruit a scaly cone, or sometimes appearing berry-like. 1. Pine Family, page 13

CLASS II

ANGIOSPERMS. Ovules enclosed in an ovary.

SUBCLASS I. — MONOCOTYLEDONS. Flowers usually with their parts in threes, never in fives. Leaves usually parallel-veined. Cotyledon 1.

	FAMILY	PAGE
(1) Flowers enclosed by chaffy bracts.		
Flowers 2-bracted. Leaves 2-ranked. Stem cylindrical	4. Grass	23
Flowers 1-bracted. Leaves 3-ranked. Stem triangular	5. Sedge	23
(2) Flowers on a spadix.		
Spadix slender, hairy, and bristly	2. Cat-tail	20
Spadix fleshy	6. Arum	23
(3) Flowers not on a spadix.		
(*a*) Carpels usually numerous and nearly or entirely separate	3. Water-plantain	21
(*b*) Carpels united.		
* Perianth free or adnate only to the base of the ovary.		
† Perianth regular, its parts similar, green, or chaffy	9. Rush	29
†† Perianth of 2 sets, one sepal-like, the other petal-like.		
Style and stigma 1. Petals 3 or 2, soon disappearing	7. Spiderwort	26

	FAMILY	PAGE
Styles or stigmas 3, separate. Petals 3, lasting several days. Leaves netted-veined . . .	10. (Trillium) Lily .	29
Style 1, stigma 3-lobed, or 6-toothed. Corolla irregular. Aquatic herbs with parallel-veined leaves	8. Pickerel-weed .	28
††† Perianth regular, its divisions all alike, or nearly so, petal-like	10. Lily	29
** Perianth adnate to the ovary.		
Anthers 6	11. Amaryllis . . .	42
Anthers 3	12. Iris	45
Anthers 1 or 2	13. Orchis	46

SUBCLASS II. — DICOTYLEDONS. Flowers usually with their parts in fives or fours. Leaves netted-veined. Cotyledons 2.

I. Apetalous Division. Flowers without a corolla or without either calyx or corolla.[1]

A.

Flowers monœcious or dicœcious, one or both sorts in catkins.		
(1) Staminate flowers in catkins, the pistillate ones solitary or clustered.		
Leaves pinnately compound	16. Walnut	49
Leaves simple	18. Beech	55
(2) Both kinds of flowers in catkins.		
(*a*) Leaves alternate.		
Ovaries in fruit becoming fleshy and combining into an aggregate fruit	20. Mulberry . . .	61
Fruit 1-seeded, a stone-fruit or minute nut. Aromatic shrubs	15. Bayberry . . .	49
Fruit a capsule, seeds with silky hairs . . .	14. Willow	47
Fruit a minute nut or akene. Mostly large shrubs or trees, not very aromatic . . .	17. Birch	51
(*b*) Leaves opposite, small parasitic shrubs . . .	22. Mistletoe . . .	63

B.

Flowers not in catkins, both calyx and corolla wanting	44. Sycamore . . .	105

[1] When only one floral envelope is present, this is said to be the calyx and the corolla is considered to be missing.

C.

Flowers not in catkins; calyx present, sometimes petal-like.

	FAMILY	PAGE
(1) Trees or shrubs.		
Flowers not hypogynous; plants not climbing	73. Dogwood	162
Flowers not hypogynous; climbing plants	24. Dutchman's Pipe	64
Flowers hypogynous.		
Style single, not cleft, fruit a key. (*Fraxinus*)	78. Olive	175
Style single, not cleft, fruit a stone-fruit	37. Laurel	88
Styles 2 or 2-cleft, fruit 1-celled	19. Elm	59
Styles 2 or 2-cleft, fruit 2-celled	58. Maple	140
Styles 3, each 2-cleft. Ovary 3-celled	53. Spurge	135
(2) Herbs.		
Flowers not hypogynous; ovary 6-celled	24. Dutchman's Pipe	64
Flowers not hypogynous; ovary 1-celled; flowers in umbel-like clusters	23. Sandalwood	64
Flower hypogynous.		
(*a*) Ovary 1-celled.		
Stamens many	32. Buttercup	77
Stamens few.		
Stipules sheathing the joints	25. Buckwheat	66
Stipules wanting.		
Rather fleshy herbs	26. Goosefoot	68
Not fleshy.		
Ovules on a free central placenta; delicate, soft-leaved herbs. (*Stellaria*)	30. Pink	71
Ovule single. Tough, with awl-shaped leaves. (*Scleranthus*)	30. Pink	71
(*b*) Ovary several-celled.		
Small prostrate herb; leaves spatulate, whorled	28. Ice-plant	69
Stipules present, not sheathing.		
Style single	21. Nettle	62
Styles 2	20. Mulberry	61
Flowers hypogynous, ovary 3-celled	53. Spurge	135
Flowers hypogynous, ovary 5-10-celled; fruit a berry	27. Pokeweed	69

II. Polypetalous Division. Calyx and corolla both present, the petals not united.

A.

Stamens more than 10.

	FAMILY	PAGE
(1) Trees, shrubs, or woody vines.		
(*a*) Leaves alternate.		
* Ovary 1, simple.		
Fruit a stone-fruit	45. Rose	105
** Ovary 1, compound; fruit dry.		
Ovary 5-celled, 1-2-seeded at maturity	63. Linden	146
Ovary 3-celled, many-seeded	68. Begonia	152
*** Ovary 1, compound; fruit fleshy	45. Rose	105
**** Ovaries numerous.		
† Leaves with stipules.		
Stamens inserted on the receptacle	34. Magnolia	85
Stamens many, monadelphous	64. Mallow	147
Stamens inserted on the calyx	45. Rose	105
†† Leaves not with stipules.		
Small trees	36. Pawpaw	88
(*b*) Leaves opposite; fruit dry.		
Ovary single, 3-5-celled	43. Saxifrage	101
Ovaries several, enclosed by the calyx tube	35. Calycanthus	87
(2) Herbs.		
(*a*) Ovary single, simple; fruit a berry	33. Barberry	84
(*b*) Ovaries several, simple.		
Stamens inserted on the receptacle	32. Buttercup	77
Stamens inserted on the calyx	45. Rose	105
(*c*) Ovary compound.		
Aquatic herbs, leaves flat	31. Water-lily	75
Marsh herbs, leaves tubular	42. Pitcher-plant	101
Terrestrial herbs.		
* Ovary 1-celled.		
Placentæ central, juice watery	29. Purslane	70
Placentæ parietal, juice milky or colored	38. Poppy	89
Placentæ 2, parietal	40. Caper	99
Placentæ 3 or more, parietal.		
Leaves alternate	41. Mignonette	100
Leaves opposite	65. St. Johnswort	148
Leaves apparently wanting, stems fleshy	69. Cactus	154
** Ovary several-celled, stamens monadelphous	64. Mallow	147
*** Ovary 3-celled, stamens not much if at all monadelphous, stems fleshy, juice acid	68. Begonia	152

B.

Stamens not more than 10.

	FAMILY	PAGE
(1) Trees, shrubs, or woody vines.		
(*a*) Fruit a stone-fruit.		
Stamens 2, rarely 3–4	78. Olive	175
Stamens as many as the petals.		
Flowers perfect.		
Stamens 4, alternate with the petals	73. Dogwood	162
Stamens 5, alternate with the petals	54. Sumac	137
Stamens 4–5, opposite the petals	61. Buckthorn	143
(*b*) Fruit a berry.		
Stamens alternate with the petals.		
Inserted on the calyx, leaves simple	43. Saxifrage	101
Inserted on a disk surrounding the ovary, leaves compound	71. Ginseng	157
Stamens opposite the petals	62. Grape or Vine	145
(*c*) Fruit a 2-seeded capsule or a key.		
Leaves compound	51. Rue	133
(*d*) Fruit a 3–5-celled capsule, flowers small, greenish, or brown-purple, leaves simple	56. Staff Tree	139
(*e*) Fruit 5-lobed, the 5 carpels separating when ripe, flowers rather large, white, or of showy colors, leaves simple	47. Geranium	129
(*f*) Fruit a 1–3-celled capsule, leaves compound, flowers irregular	59. Buckeye	142
(*g*) Fruit a 3-celled bladdery capsule, leaves compound, flowers regular	57. Bladder Nut	140
(*h*) Fruit a legume	46. Pea or Pulse	117
(2) Herbs.		
(*a*) Ovary single, 1-celled, simple or compound.		
* Corolla regular, or nearly so.		
Sepals and petals 4–5; stamens 5, 10, or 12, distinct.		
Leaves alternate.		
Stigma single	46. Pea or Pulse	117
Stigmas 4	43. Saxifrage	101
Leaves opposite, punctate, flowers yellow	65. St. Johnswort	148
Leaves opposite, flowers white or red	30. Pink	71
Sepals and petals 4–5; stamens 5, united	67. Passion Flower	151
Sepals 2, petals 4–5	29. Purslane	70

	FAMILY	PAGE
Sepals 6, stamens hypogynous, opposite the petals	33. Barberry	84
** Corolla irregular.		
Fruit a legume	46. Pea or Pulse	117
Fruit a capsule.		
Stamens 5	66. Violet	149
Stamens 6, in 2 sets	38. Poppy	89
(*b*) Ovary single, 2-5-celled, fruit dry.		
* Ovary 2-celled.		
Flowers in umbels, stamens 5	72. Parsley	158
Flowers not in umbels, petals 4 or 0, stamens 6	39. Mustard	93
Flowers not in umbels, petals 3, stamens 6 or 8	52. Polygala	134
** Ovary a 4-celled capsule	70. Evening Primrose	156
*** Ovary of 3 nearly distinct lobes, which become thick and fleshy in fruit	49. Indian Cress	132
**** Ovary a 5-celled capsule.		
† Leaves simple.		
Parasitic white or yellowish herbs, or evergreen herbs, not parasitic, capsule many-seeded	74. Pyrola	164
Terrestrial, not much if at all fleshy, capsule 5-10-seeded.	47. Geranium	129
Terrestrial, stem fleshy and translucent, capsule elastic, several-seeded	60. Balsam	143
†† Leaves of 3 leaflets	48. Wood-sorrel	131
(*c*) Ovary of 5 principal cells, each more or less divided by a partition into 2 cells; seeds flattish, with a mucilaginous coating	50. Flax	132
(*d*) Ovary single, 2-5-celled; fruit a berry	71. Ginseng	157
(*e*) Ovaries 2, seeds hairy-tufted	81. Milkweed	180

III. Gamopetalous Division. Calyx and corolla both present, the petals more or less united.

(1) Trees, shrubs, or woody vines.		
(*a*) Leaves alternate.		
* Fruit splitting open.		
Fruit a legume	46. Pea or Pulse	117
Fruit a 5-celled capsule	75. Heath	166
** Fruit not splitting open, a stone-fruit	55. Holly	138
*** Fruit a berry.		

	FAMILY	PAGE
Ovary not adnate to the calyx; seeds few, large	77. Ebony	174
Ovary not adnate to the calyx; seeds many, small	88. Nightshade	198
Ovary adnate to the calyx	75. Heath	166
(*b*) Leaves opposite.		
* Fruit a 2-celled, 2-seeded capsule	95. Madder	212
** Fruit a 2-celled, many-seeded capsule.		
Seeds winged	90. Bignonia	206
Seeds not winged; shrubs	96. Honeysuckle	215
*** Fruit a 5-celled capsule	75. Heath	166
**** Fruit a stone-fruit or berry.		
Fruit 1-2-seeded; stamens 2	78. Olive	175
Fruit 1-4-seeded; stamens 4	86. Verbena	192
Fruit 1-5-seeded; stamens 5	96. Honeysuckle	215
(2) Herbs.		
(*a*) Ovary not adnate to the calyx, flowers regular.		
* Ovary separating into 2 distinct follicles.		
Style single, stamens distinct	80. Dogbane	178
Styles 2, stamens united	81. Milkweed	180
** Ovary 1-celled.		
Fruit a legume	46. Pea or Pulse	117
Fruit a capsule.		
Leaves alternate.		
Stamens opposite the lobes of the corolla	76. Primrose	171
Stamens alternate with the lobes of the corolla	84. Waterleaf	187
Leaves opposite	79. Gentian	177
Leaves all reduced to mere scales, plants never green, root-parasites	91. Broom-rape	208
*** Ovary 2-several-celled.		
Stamens 2 or 4	94. Plantain	211
Stamens 5, cells of the ovary 1-2-seeded.		
Fruit separating into 4 nutlets	85. Borage	188
Fruit a capsule	82. Morning-glory	183
Stamens 5, cells of the ovary several-seeded.		
Stigma 1	88. Nightshade	198
Stigmas 3	83. Phlox	185
(*b*) Ovary not adnate to the calyx, flowers irregular.		
* Ovary 1-celled.		

	FAMILY	PAGE
Fruit a legume	46. Pea or Pulse	117
Fruit a capsule	92. Bladderwort	209
** Ovary 2–4-celled.		
† Cells each 1-seeded.		
Ovary deeply 4-lobed	87. Mint	193
Ovary not deeply lobed.		
Stamens 2 or 4	86. Verbena	192
Stamens 8	52. Polygala	134
†† Cells each 2-several-seeded.		
Corolla lobes imbricated in the bud	89. Figwort	201
Corolla lobes convolute in the bud	93. Acanthus	210
(*c*) Ovary adnate to the calyx tube.		
Flowers in an involucrate head	100. Composite	224
Flowers not in heads.		
Stamens 3.		
Leaves opposite	97. Valerian	220
Leaves alternate	98. Gourd	221
Stamens 4–5.		
Leaves alternate	99. Campanula	223
Leaves opposite or whorled	95. Madder	212

CLASS I. — GYMNOSPERMS.

Plants destitute of a closed ovary, style, or stigma. Ovules generally borne naked on a carpellary scale, which forms part of a cone. Cotyledons often several (Fig. 1).

1. CONIFERÆ. Pine Family.

Trees or shrubs with wood of peculiar structure (Part I, Ch. VI), destitute of ducts, with resinous and aromatic juice. Leaves generally evergreen, and needle-shaped or awl-shaped. Flowers destitute of floral envelopes, monœcious or dicœcious, the staminate ones consisting of catkin-like spikes of stamens and the pistillate ones consisting of ovule-bearing scales, arranged in spikes, which ripen into cones.

A.

Each scale of the cone borne in the axil of a bract. Seeds 2, with wings.

Leaves evergreen, in bundles of 2–5. Pinus, I.

Leaves evergreen, solitary, sessile, keeled on both surfaces. Picea, II.

Leaves evergreen, solitary, petioled, flat. Tsuga, III.

Leaves solitary, evergreen, flat above, keeled below. Abies, IV.

Leaves clustered, deciduous, flat. Larix, V.

B.

Scales of the cone without bracts, cone becoming globular and woody. Leaves linear.

Leaves alternate, deciduous. Taxodium, VI.

C.

Scales of the cone few, without bracts. Leaves evergreen, generally scale-like or awl-shaped.

Cones dry and thin-scaled. Thuya, VII.

Cones berry-like. Juniperus, VIII.

I. PINUS, Tourn.

Sterile flowers somewhat resembling inconspicuous catkins, borne at the base of the young shoot of the season, each flower consisting of pollen-scales in spiral groups (Fig. 1, *2*). Fertile flower-spikes which consist of spirally arranged carpel-scales, each scale springing from the axil of a bract and bearing at its own base two ovules (Fig. 1, *3*). Fruit a cone, formed of the thickened carpellary scales, ripening the second autumn after the flower opens. Primary leaves, thin and chaffy bud-scales, from the axils of which spring the bundles of 2–5 nearly persistent, needle-like, evergreen leaves, from 1–15 in. long (Fig. 1).

1. **P. Strobus, L.** WHITE PINE. A tall tree, 75–160 ft. high, much branched and spreading when growing in open ground, but often with few or no living branches below the height of 100 ft. when growing in dense forests. Leaves clustered in fives, slender, 3–4 in. long, smooth, and pale, or with a whitish bloom. Cones 5–6 in. long, not stout. The wood is soft, durable, does not readily warp, and is therefore very valuable for lumber. In light soil, commonest N.

2. **P. Tæda, L.** LOBLOLLY PINE, OLDFIELD PINE. A large tree; bark very thick and deeply furrowed, becoming flaky with age, twigs scaly. Leaves in threes, 6–10 in. long, slender, very flexible; sheaths $\frac{3}{4}$–1 in. long. Cones solitary, oblong-conical, 3–5 in. long; scales thickened at the apex, the transverse ridge very prominent, and armed with a short, stout, straight, or recurved spine. Common and often springing up in old fields; trunk containing a large proportion of sap wood; timber of little value for outside work.*[1]

3. **P. rigida, Mill.** NORTHERN PITCH PINE. A stout tree, 30–80 ft. high, with rough scaly bark. Leaves in threes, 3–5 in. long, stiff and flattened. Cones ovoid-conical, 2–3 in. long, their

[1] Descriptions followed by an asterisk are taken (more or less simplified) from Professor Tracy's flora in the *Southern States Edition*.

scales tipped with a short, abruptly curved spine. Wood hard, coarse and resinous, mainly used for fuel. Poor, sandy soil, especially eastward.

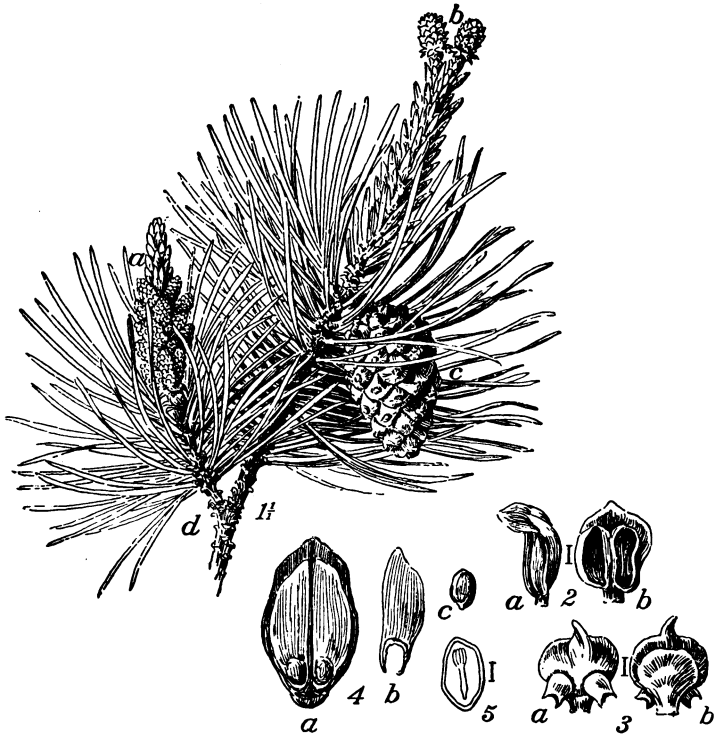


FIG. 1.—Scotch Pine (*P. sylvestris*).

1, a twig showing: *a*, staminate catkins; *b*, pistillate catkins; *c*, a cone; *d*, needles. 2, an anther, *a*, side view; *b*, outer surface. 3, a carpel-scale, *a*, inner surface; *b*, outer surface. 4, a cone-scale, a seed-wing, and a seed. 5, section of a seed, showing the embryo. (1) is natural size; the other parts of the figure are magnified by the amount indicated by comparison with the vertical line alongside each.

4. P. inops, Ait. SCRUB PINE. A small tree, usually 20–30 ft. high, but sometimes much taller; bark of the trunk rough, nearly black; twigs smooth and with a bloom. Leaves in twos, 1–2 in.

long, rigid, sheaths very short. Staminate catkins dull yellowish-purple, 1 in. long. Cones solitary, short-peduncled, often reflexed, ellipsoid-conic, about 2 in. long; scales thickened at the apex and armed with a slender, straight, or recurved prickle. On dry, sandy soil; wood light, soft, weak, and of little value.*

5. **P. sylvestris, L.** Scotch Pine (wrongly called Scotch Fir). A medium-sized tree, with the older bark reddish and scaly. Leaves in twos, 1½–2½ in. long. Cones rather small and tapering (Fig. 1, I *c*). Cultivated from Europe.

6. **P. resinosa, Ait.** Red Pine, Norway Pine. A tall, rather slender tree, with bark reddish-brown and moderately smooth. Leaves in twos, slender, and 5–6 in. long. Cones borne at the ends of the branches, smooth, about 2 in. long. A valuable timber tree, which often grows in small, scattered clumps; wood firm, pale red, and not very resinous; used in house and bridge building, and for masts and spars.

7. **P. palustris, Mill.** Long-leaved Pine. A large tree; bark thin-scaled, wood very resinous, old trees with only a few spreading branches near the top. Leaves in threes, 10–15 in. long. Sheaths 1–1¼ in. long, crowded near the ends of very scaly twigs. Staminate catkins 2–3 in. long, bright purple, conspicuous. Cones terminal, ellipsoid-conical, 6–10 in. long, diameter 2–3 in. before opening, 4–6 in. when fully opened; scales much thickened at the apex and armed with a short recurved spine at the end. The most common tree in the pine barrens; wood hard, strong, and durable, especially valuable for floors and inside work.*

II. PICEA, Link.

Sterile flowers generally axillary (sometimes terminal), borne on the twigs of the preceding year. Fertile flowers terminal. Fruit a nodding, thin-scaled cone, ripening in the first autumn. Leaves evergreen, needle-shaped, four-angled, scattered or spirally arranged.

1. **P. nigra, Link.** Black Spruce. A small tree, usually only 20 or 30 ft. high, often less. Leaves strongly 4-angled, bluish-green, and glaucous, ¼–¾ in. long. Cones ovoid, pointed, ½–1½ in., usually about 1 in. long, persisting sometimes for 20–30 years. Wood of little value except for paper-pulp. The tree is especially abundant northward, and is of common occurrence in peat-bogs.

2. **P. rubra, Dietrich.** Red Spruce. A large tree, 70–80 or even 100 or more feet high, of strict conical habit. Leaves dark green or yellowish and glossy, ½–⅝ long. Cones ovoid-oblong, acute, usually 1½–2 in. long, mostly falling the first year. This is the principal

timber-spruce of the northeastern United States, and furnishes much rather tough lumber for use in floor-joists, scantling, and similar purposes.

3. **P. alba, Link.** WHITE SPRUCE, SKUNK SPRUCE, CAT SPRUCE. A tall, rather conical tree, 60–70 ft. high. Leaves pale and with a bloom sometimes ¾ in. long. Cones cylindrical, with rounded ends, about 2 in. long, falling inside of one year. A handsome tree, valuable for timber, ranging far northward.

4. **P. excelsa, Link.** NORWAY SPRUCE. A large tree. Leaves dark green, ¾–1 in. long. Cones 5–7 in. long. Cultivated from Europe.

III. TSUGA, Carrière.

Sterile flowers, clusters of stamens springing from the axils of leaves of the preceding year. Cones terminal, on twigs of the preceding year, drooping, thin-scaled, ripening the first year. Leaves minutely petioled, short, flat, white beneath, 2-ranked.

1. **T. canadensis, Carrière.** HEMLOCK. A large tree, in age branchless below when growing in dense woods. When young the spray is very graceful and abundant. Leaves short-linear. Cones ¾ in. or less in length. The wood is coarse and splintery, but useful for fences and other rough work. The thick reddish bark is of great value for tanning.

IV. ABIES, Link.

Sterile flowers from axils of leaves of the preceding year. Cones erect, on the sides of the branches, with deciduous scales, ripening the first year. Leaves scattered, but on horizontal branches appearing 2-ranked, flat above, silvery, and with a prominent midrib below.

1. **A. balsamea, Miller.** BALSAM FIR. A slender tree, 50–60 ft., occasionally 80 ft., high, with dense foliage. Leaves narrowly linear, less than 1 in. long. Cones violet-colored until old, cylindrical, 2–4 in. long. The bark contains many large blisters, filled with the well-known Canada balsam. The wood is brittle, and of little value.

V. LARIX, Tourn.

Flower-spikes short, opening in early spring, before the leaves; the fertile ones, while still young, of a beautiful crim-

son color. Fruit a small cone, with thin scales. Leaves none of them scaly, but all needle-shaped, soft, deciduous, very numerous, in little brush-like bundles.

1. **L. americana, Michx.** AMERICAN LARCH, TAMARACK, HACKMATACK (wrongly, but quite generally, called Cypress and Juniper). A tall, slender tree, 30–100 ft. high. Leaves slender and less than 1 in. long, very pale bluish-green. Cones $\frac{1}{2}$–$\frac{3}{4}$ in. long, few-scaled. Wood hard, tough, and heavy, of considerable use for ship-building.

2. **L. europæa, DC.** EUROPEAN LARCH. Leaves bright green and longer; cones longer than in the preceding species and many-scaled. Cultivated from Europe.

VI. TAXODIUM, Richard.

Trees; leaves spreading so as to appear 2-ranked, deciduous; flowers monœcious, appearing before the leaves; staminate ones numerous, globose; forming long, terminal, drooping, panicled spikes; anthers 2–5-celled; pistillate flowers single or in pairs, bractless, the peltate scales 2-ovuled; cone globose; the very thick woody scales angular, separating at maturity; seeds 3-angled, pyramidal.*

1. **T. distichum, Richard.** BALD CYPRESS. A very large tree; bark dark brown, rough, fibrous; many of the twigs deciduous with the leaves. Leaves alternate, opposite, or whorled, 2-ranked, flat, linear, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Cones terminal, globose, about 1 in. in diameter; ends of the scales much thickened, wrinkled, and with a distinct triangular marking. Common in swamps and on the borders of streams; wood reddish, soft, light; specially valuable for shingles and fence posts, and for boat-building.*

VII. THUYA, Tourn.

Flowers small, terminal, monœcious, on different branches. Stamens each consisting of a scale-like portion bearing 4 anther-cells. Pistillate flowers consisting of a few overlapping scales which ripen into a small, loose cone. Leaves evergreen, opposite, and closely overlapping on the stem, of two kinds, those on the more rapidly growing twigs awl-shaped, the others mere scales.

1. **T. occidentalis, L.** ARBOR VITÆ, CEDAR. A small tree, 20–50 ft. high, with soft fibrous bark. Leaves mostly awl-shaped and blunt.

Cones ellipsoidal, their scales 2-seeded. Grows on rocky ledges, but reaches its greatest size in cool cedar swamps. Wood soft, yellowish, fragrant, durable, prized for shingles and fence posts.

VIII. JUNIPERUS, L.

Flowers very small, lateral, dicœcious, or sometimes moncœcious. Scales of the staminate flower shield-shaped, with 3–6 anther-cells. Fertile flowers with 3–6 fleshy scales which unite into a berry-like, 1–3-seeded fruit. Leaves awl-shaped or scale-shaped.

1. **J. communis, L.** JUNIPER. A low, spreading shrub (one variety prostrate in circular masses). Leaves linear-awl-shaped, with needle-like points, each marked with a distinct stripe of bloom along the center of the upper surface, borne in whorls of three. Fruit a dark blue aromatic berry, ¼ in. or more in diameter. Grows in dry pastures and on sterile hillsides N.

2. **J. virginiana, L.** RED CEDAR, SAVIN. Ranges in size and shape from a low, rather erect, shrub to a conical tree 90 ft. high. Leaves of two kinds, those on the rapidly growing shoots awl-shaped and pointed, those on the shortest twigs scale-shaped, obtuse, or nearly so, and closely appressed to the stem. Fruit small, bluish, with a white bloom. Found all the way from British America to Florida. Wood soft, fragrant, reddish, exceedingly durable in the ground, valued for the manufacture of moth-proof chests and especially for lead-pencils.

CLASS II. — ANGIOSPERMS.

Plants with a closed ovary, in which the seeds are matured. Cotyledons 1 or 2.

SUBCLASS I. — MONOCOTYLEDONOUS PLANTS.

Stems with the fibro-vascular bundles scattered among the parenchyma cells; in perennial plants no annual rings of wood. Leaves usually parallel-veined, alternate, nearly always entire. Parts of the flower generally in threes (never in fives). Cotyledon 1.

2. TYPHACEÆ. Cat-tail Family.

Perennial marsh or aquatic plants. Rootstock stout, creeping; stem simple, cylindrical, erect. Leaves simple, strap-shaped, sheathing at the base, nerved and striate. Flowers monœcious, in a single terminal spike, staminate part of the spike uppermost, each part subtended by spathe-like deciduous bracts; perianth of fine bristles; staminate flowers sessile; stamens 2–7. Filaments connate, subtended by minute bracts; pistillate flowers short-pediceled. Ovary 1–2-celled; styles 1–2. Fruit small, nut-like.*

TYPHA, Tourn.

Characters of the family.

1. **T. latifolia, L.** Cat-tail. Stem erect, jointed below, 5–8 ft. high. Leaves nearly as long as the stem, about 1 in. wide, netted and with a bloom. Spike cylindrical, dark brown or black; staminate portion above the pistillate, usually without any interval between them, each 4–8 in. long and about 1 in. in diameter. Fruit furrowed. Common in marshes and shallow ponds.*

3. ALISMACEÆ. Water-plantain Family.

Annual or perennial marsh herbs, usually with creeping runners or rootstocks. Stems scape-like. Leaves long-petioled, sheathing at the base; petiole rounded; blade nerved, netted, or sometimes wanting. Flowers in racemes or panicles, perfect, monœcious or dicœcious; pedicels in bracted whorls. Sepals 3, persistent, petals 3 or wanting. Stamens 6 or more. Ovaries few or many, 1-celled, 1-seeded. Style short or none. Fruit a 1-seeded akene.*

I. ALISMA, L.

Annual or perennial herbs. Leaves erect or floating, blades prominently ribbed and netted, or even pinnately veined. Scapes erect, becoming longer than the leaves, cylindrical, spongy. Flowers perfect, in paniculate 3-bracted umbels, small, white or pink. Stamens 6–9. Ovaries numerous in one or more whorls on a flat receptacle. Fruit 1-seeded akenes which are ribbed on the back and sides.*

1. **A. Plantago, L.** Water Plantain. Perennial; root fibrous. Leaves ovate or somewhat cordate, 5–7-nerved when erect, floating leaves narrower and sometimes linear. Scapes usually single; panicle 1–2 ft. long; flowering branches whorled, subtended by three narrow, striate bracts; pedicels slender, elongated. Ovaries 15–20 in a single whorl; base of the short style persistent, forming a beak at the inner angle of the akene. Akenes obliquely obovate, 2–3-keeled on the back. Common in ponds and muddy places.*

II. SAGITTARIA, L.

Perennial; rootstocks mostly knobby or tuber-bearing. Scapes erect or decumbent. Leaves long-petioled, sheathing at the base, the blade round and netted, or wanting. Flowers monœcious or dicœcious, racemed in 3-bracted whorls of threes, the upper flowers usually staminate. Sepals 3, persistent. Petals 3, withering-persistent or deciduous. Stamens few or many. Ovaries in globose heads, 1-ovuled; style short, persistent. Fruit a subglobose head of flattened akenes.*

1. **S. variabilis, var. latifolia, Willd.** BROAD-LEAVED ARROWHEAD. Leaves very variable in size and shape, from broadly sagittate to linear; those growing on the drier soil being usually the broader; petioles 6–30 in. long. Scape smooth or slightly downy, 6–36 in. high; bracts acute. Flowers monœcious or sometimes diœcious, white, 1 in. or more in width; pedicels of the staminate flowers twice the length of those of the fertile flowers. Filaments long, smooth, and slender. Akenes with beak nearly horizontal. Ditches and muddy places.*

2. **S. graminea, Michx.** GRASS-LEAVED SAGITTARIA. Leaves long-petioled, lanceolate, or elliptical, and acute at each end, 3–5-nerved, or often linear, the earlier often reduced to flattened petioles. Scape slender, usually longer than the leaves, simple, weak, often prostrate in fruit; bracts small, ovate, connate at the base. Flowers monœcious or diœcious, on long, thread-like pedicels, about ½ in. wide. Stamens 10–20, filaments downy. Akenes nearly beakless. In ditches and shallow pools.*

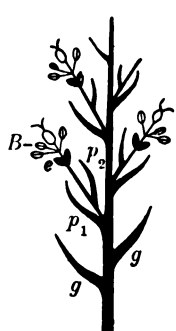


FIG. 2. — Diagram of Inflorescence of a Grass.

g, sterile glumes; P_1, a flowering glume; P_2, a scaly bract (palea); *e*, transparent scales (lodicules) at the base of the flower; *B*, the flower.

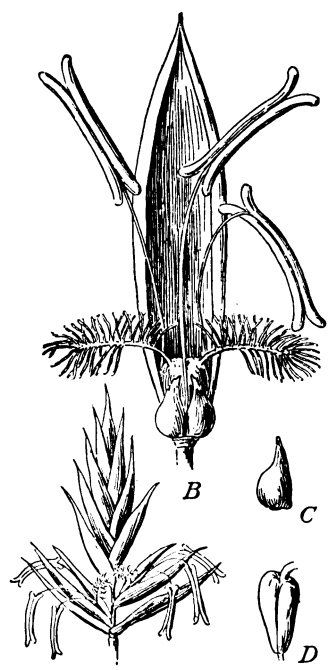


FIG. 3. — Fescue-grass (*Festuca pratensis*).

A, spikelet (compare Fig. 2); *B*, a flower, the lodicules in front and the palea behind; *C*, a lodicule; *D*, ovary.

4. GRAMINEÆ. Grass Family.

Mostly herbs, with usually hollow stems, closed and enlarged at the nodes. Leaves alternate, in two ranks, with sheathing bases, which are split open on the side opposite the blade. Flowers nearly or quite destitute of floral envelopes, solitary, and borne in the axils of scaly bracts called *glumes*, which are arranged in two ranks overlapping each other on 1–many-flowered *spikelets;* these are variously grouped in spikes, panicles, and so on. Fruit a grain. (The family is too difficult for the beginner, but the structure and grouping of the flowers may be gathered from a careful study of Figs. 2, 3.)

5. CYPERACEÆ. Sedge Family.

Grass-like or rush-like herbs, with solid, usually triangular, stems, growing in tufts. The sheathing base of the generally 3-ranked leaves, when present, is not slit as in grasses. The flowers are usually somewhat less enclosed by bracts than those of grasses; the perianth is absent or rudimentary; stamens generally 3; style 2-cleft or 3-cleft.

The general appearance of a common sedge may be learned from Part I, Ch. V, and the flower-cluster and the flower understood from an inspection of Fig. 4.

The species are even more difficult to determine than those of grasses.

6. ARACEÆ. Arum Family.

Perennial herbs, with pungent or acrid juice, leaves often netted-veined, small flowers (perfect or imperfect) clustered along a peculiar fleshy spike called a *spadix*, and frequently more or less covered by a large, hood-like bract called a *spathe*. Perianth, when present, of 4–6 parts; often wanting. Fruit usually a berry.

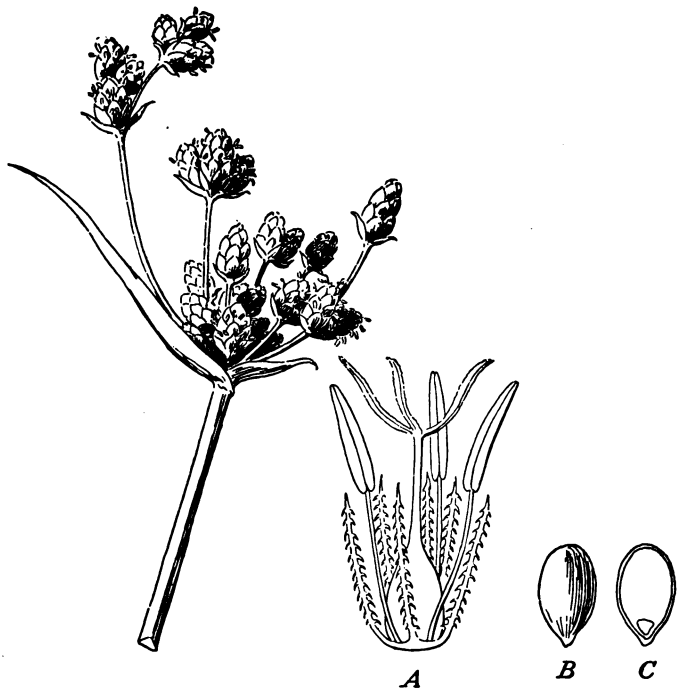


FIG. 4.—Inflorescence, Flower, and Seed, of a Sedge.

(Great Bulrush, *Scirpus lacustris*.)

A, magnified flower, surrounded by a perianth of hypogynous bristles; *B*, the seed; *C*, section of the seed, showing the small embryo enclosed in the base of the endosperm.

I. ARISÆMA, Martius.

Perennial herbs, springing from a corm or a tuberous rootstock.

Spathe rolled up at base. Summit of spadix naked, the lower part flower-bearing; staminate flowers above, pistillate ones below. Stigma flat; ovary 1-celled; berry 1–few-seeded.

1. **A. triphyllum, Torr.** INDIAN TURNIP, JACK-IN-THE-PULPIT. Leaves generally 2, each of 3 elliptical-ovate, pointed leaflets. Spadix club-shaped, bearing usually only one kind of fully developed flowers; that is, full-sized pistillate and rudimentary staminate ones, or the reverse. Spathe much longer than the spadix, and covering it like a hood. Corm turnip-like, but much wrinkled, very starchy, and filled with intensely burning juice.

2. **A. Dracontium, Schott.** GREEN DRAGON, DRAGON ROOT. Leaf usually single, divided into 7–11 rather narrow-pointed leaflets; spadix tapering to a long, slender point, often bearing fully developed staminate and pistillate flowers.

II. SYMPLOCARPUS, Salisb.

Rootstock very stout, with many long, cylindrical roots. Leaves clustered, very large, and entire. Spathe shell-shaped, very thick. Spadix globular, thickly covered with perfect flowers. Sepals 4. Stamens 4. Style 4-angled. Fruit globular or ellipsoidal, with the seeds slightly buried in the enlarged spadix.

Coarse, stemless herbs, with a powerful scent like that of the skunk and of onions.

1. **S. fœtidus, Salisb.** SKUNK CABBAGE. Leaves many, slightly petioled, 1–2 ft. long, appearing after the flowers. The latter are usually seen before the ground is wholly free from frost, often earlier than any other flower. Bogs and wet meadows, very common N.

III. ACORUS, L.

Rootstocks horizontal, long, and moderately stout, aromatic. Leaves long, upright, sword-shaped. Spathe much like the leaves. Spadix projecting from the edge of the spathe, consisting of numerous perfect flowers. Sepals 6. Stamens 6. Ovary 2–3-celled, with numerous ovules. Fruit 1–few-seeded.

1. **A. Calamus, L.** SWEET FLAG. Scape with a long, leaf-like prolongation (spathe) beyond the green, very closely flowered, spadix. Along borders of brooks and swamps.

The rootstocks furnish the well-known calamus or "sweet flag-root" sold everywhere by druggists.

7. COMMELINACEÆ. Spiderwort Family.

Herbs, with slimy or mucilaginous juice; stems somewhat succulent, jointed, leafy, simple or branched. Leaves simple, succulent, narrow, entire, sheathing at the base, sheaths entire

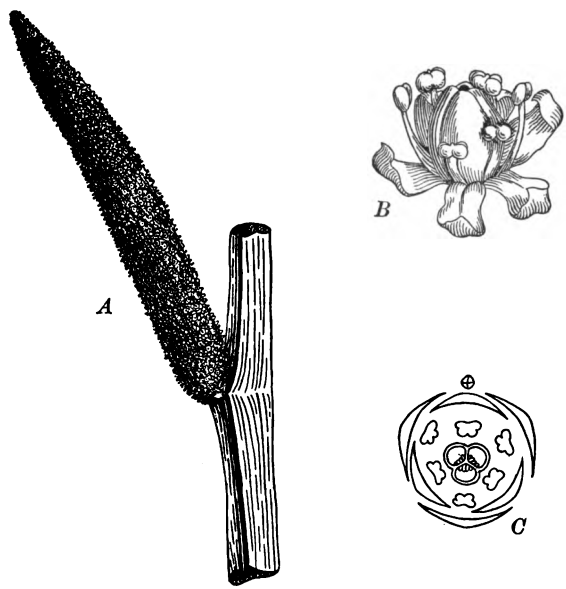


Fig. 5. — *Acorus Calamus.*

A, spadix; *B*, a single flower, enlarged; *C*, diagram of flower, enlarged.

or split. Flowers in terminal cymes or umbels, perfect, often irregular. Sepals 3, persistent, foliaceous or colored. Petals 3, soon falling or liquefying; stamens 6 or fewer, often some of them abortive. Ovary 2–3-celled; style single, stigma entire or 3-lobed, fruit a 2–3-celled, 2–3-valved capsule, seeds solitary or several in each cell.*

I. COMMELINA, Dill.

Annual or perennial, stem branching, erect or procumbent, smooth or downy. Leaves petioled or sessile, entire, the floral ones heart-shaped, folded, and forming a spathe enclosing the base of the cymes. Flowers irregular, sepals mostly colored, 1 of them smaller. Petals blue, unequal, 2 of them kidney-shaped and long-clawed, the other smaller. Stamens 6, only 3 of them fertile, filaments smooth. Capsule 1–3-celled, seeds 1–2 in each cell.*

1. **C. virginica, L.** VIRGINIA DAYFLOWER. Stem erect, downy, 1–2 ft. high. Leaves lanceolate to oblong-lanceolate, taper-pointed, 3–5 in. long, somewhat rough above, sheaths inflated, hairy, the opening often fringed. Spathes containing a slimy secretion. Flowers 1 in. wide, the odd petal lanceolate. Capsule 3-seeded, the dorsal cell not splitting open. On moist, sandy soil.*

II. TRADESCANTIA, L.

Perennial, stem simple or branched. Leaves very narrow. Flowers in terminal and axillary bracted umbels, regular, 1 in. broad. Sepals 3, herbaceous. Petals 3, soon falling or liquefying to jelly. Stamens 6, sometimes 3 shorter than the others, filaments bearded or smooth. Ovary 3-celled, with 2 ovules in each cell, pedicels recurved in fruit. Capsule 3-celled, 3-valved, 3–6-seeded.*

1. **T. virginica, L.** SPIDERWORT. Stem erect, stout, smooth, or with long, soft hairs, 1–2 ft. high. Leaves linear, keeled, often purple-veined, long, taper-pointed, 1 ft. or more in length. Bracts similar to the leaves, umbels sessile, 2–many-flowered, flowers in 2 rows in the bud. Petals blue or purple, twice as long as the sepals. Stamens blue, filaments densely bearded. Capsule ovoid or oblong. On dry, sandy soil.*

2. **T. pilosa, Lehm.** HAIRY SPIDERWORT. Stem stout, erect, or zigzag, branched, with long, soft hairs, or nearly smooth, 1–2 ft. high. Leaves linear-oblong, taper-pointed at the apex, narrowed at the base, hairy on both sides. Umbels axillary and terminal, many-flowered. Pedicels and sepals with soft, glandular hairs. Flowers blue or purple, $\frac{3}{4}$–1 in. wide. Seeds pitted. In rich soil.*

III. ZEBRINA, Schnizl.

Trailing or slightly climbing herbs. Leaves often striped. Flowers irregular, usually in pairs. Calyx with a short tube, regularly or irregularly 3-parted. Corolla nearly regular, with tube longer than the calyx. Filaments naked or bearded. Ovary 3-celled, 3–6-ovuled.

1. **Z. pendula, Schnizl.** WANDERING JEW. Stems perennial, prostrate, or nearly so, branching freely, rooting easily at the nodes. Leaves somewhat succulent, lance-ovate or oblong, crimson beneath, green or dark purplish above, often with two wide silvery stripes. Cultivated from Mexico.

8. PONTEDERIACEÆ. PICKEREL-WEED FAMILY.

Perennial marsh or aquatic herbs, stems simple or branched, succulent. Leaves simple, alternate. Flowers solitary or spiked, each subtended by a leaf-like spathe, perfect, mostly irregular. Perianth corolla-like, 6-parted. Stamens 3 or 6, unequal, inserted irregularly in the tube or throat of the perianth. Ovary free, style single, stigma entire or toothed, ovary 1 or 3 celled. Fruit a 1-seeded utricle.*

PONTEDERIA, L.

Stem erect, from a thick, creeping rootstock, bearing a single leaf above the middle and several sheathing, bract-like leaves at its base. Radical leaves numerous, thick, parallel-veined. Petiole long, from a sheathing base. Flowers in terminal spikes. Perianth 2-lipped, lobes of the upper lip ovate, of the lower oblong, spreading. Stamens 6, the 3 upper short and often imperfect, the 3 lower protruding. Ovary 3-celled, but only 1 cell ovule-bearing. The 1-seeded utricle enclosed by the base of the perianth.*

1. **P. cordata, L.** PICKEREL-WEED. Stem stout, erect, 2–4 ft. high. Leaves long, from heart-shaped to lanceolate and often halberd-shaped, apex and basal lobes obtuse, finely nerved. Spike dense,

2–4 in. long, peduncles enclosed by the spathe. Perianth hairy, blue, the upper lip with 2 yellow spots, tube 6-ribbed, curved, rather longer than the lobes. Ovary oblong. In ponds and slow streams.*

9. JUNCACEÆ. Rush Family.

Grass-like perennial or annual herbs, mostly growing on wet soil. Stems mostly erect but sometimes creeping, simple or branched, naked or leafy and jointed. Leaves cylindrical, sheathing at the base, very slender and pointed or flattened and grass-like. Flowers in cymes or panicles, which may be very loose and spreading, or so compact as to form a head, sometimes with a rigid scape prolonged beyond the flower-cluster. Flowers usually bracted, perianth of 6 nearly equal scale-like persistent divisions. Stamens 3 or 6, inserted on the base of the perianth. Ovary free, 1 or 3 celled, many-ovuled. Style single, stigmas 3, usually hairy. Fruit a 1 or 3 celled, 3–many-seeded capsule. [Most species flower late in the season, and their identification is too difficult for one without considerable experience.] *

10. LILIACEÆ. Lily Family.

Mostly herbs. Flowers regular and symmetrical. Perianth free from the ovary. Stamens nearly always 6, one before each division of the perianth. Ovary usually 3-celled. Fruit a pod or berry, few–many-seeded.

Except in the genus Trillium the divisions of the perianth are colored nearly alike.

SUBFAMILY I. — LILIACEÆ PROPER.

Not tendril-climbers, rarely diœcious.

A.

Styles or sessile stigmas 3, more or less separate.

Leaves 3-ranked, strongly nerved and plaited. Flowers somewhat monœcious, small. Veratrum, I.

Leaves flat, lanceolate, or spatulate. Flowers diœcious, showy. Chamælirium, II.

Leaves grass-like. Flowers perfect, showy. Amianthium, III.

B.

Style undivided (in No. XXIII, 3 sessile stigmas). Plants from root-stocks.

Leaves perfoliate. Flowers solitary, drooping, yellow. Uvularia, IV.

Leaves broad, clasping. Flowers solitary or nearly so, drooping, yellow. Oakesia, V.

Leaves scale-like. Thread-like branches borne in their axils. Flowers small, bell-shaped. Asparagus, XVII.

Leaves several–many, sessile or clasping, alternate. Flowers small, 6-parted, white, in a terminal simple or compound raceme. Smilacina, XVIII.

Leaves only 2–3, sessile or slightly petioled. Flowers very small, 4-parted, solitary or in a small terminal cluster. Maianthemum, XIX.

Leaves clasping. Flowers solitary or in pairs, greenish-white or rose-purple, borne on pedicels abruptly bent near the middle. Streptopus, XX.

Leaves nearly sessile or partly clasping. Flowers axillary, greenish, on pedicels jointed near the flower. Polygonatum, XXI.

Leaves only 2, directly from the rootstock. Flowers in a raceme, bell-shaped, white, sweet-scented. Convallaria, XXII.

Leaves 3, netted-veined. Flower single, large, terminal. Trillium, XXIII.

C.

Style undivided. Plants from fibrous roots.

Flowers yellow or orange. Hemerocallis, VI.

Flowers white. Yucca, XVI.

D.

Style usually undivided. Plants from coated or solid-looking bulbs.

Leafy-stemmed plants. Flowers large, solitary, or apparently umbelled. Fritillaria, IX.

Apparently stemless plants.

(*a*) Plants with the smell of onions or garlic. Flowers umbelled. Allium, VII.

(*b*) Flower solitary, erect, large. Tulipa, X.

(*c*) Flower solitary, nodding. Erythronium, XI.

(*d*) Flowers racemed. Perianth with hardly any tube. Stigma a single knob. Scilla, XII.

(*e*) Flowers racemed. Perianth with hardly any tube. Stigma 3-cleft. Camassia, XIII.

(*f*) Flowers corymbed. Perianth with hardly any tube. Leaves linear. Ornithogalum, XIV.

(*g*) Flowers racemed. Perianth with a tube. Leaves lance-linear. Hyacinthus, XV.

E.

Style undivided. Plants from scaly bulbs. Lilium, VIII.

SUBFAMILY II. — SMILACEÆ.

Climbers, often tendril-bearing. Flowers diœcious. Smilax, XXIV.

I. VERATRUM, Tourn.

Simple-stemmed perennials. Roots fibrous, from the thickened base of the stem, poisonous, emetic. Leaves 3-ranked, plaited, and veiny. Flowers panicled, greenish, or brownish. Sepals 6, spreading, nearly free from the ovary. Stamens shorter than the perianth, and inserted on its base. Ovary of 3 carpels united at base. Fruit a few-seeded capsule, splitting into 3 parts.

1. **V. viride, Ait.** WHITE HELLEBORE, INDIAN POKE. Stem stout, 2–7 ft. high, very leafy. Flowers very numerous, in a panicle, composed of spike-like racemes. Sepals yellowish-green. Wet meadows and brooksides.

2. **V. Woodii, Robbins.** Stem slender, 2–5 ft. high, not very leafy. Flowers in a long, narrow panicle. Sepals greenish-purple or almost black. Woods and dry hillsides.

II. CHAMÆLIRIUM, Willd.

Rootstock short and thick, bitter. Stem simple, erect, leafy, smooth. Lower leaves spatulate to obovate, the stem-leaves narrower. Flowers small, white, in a spike-like raceme, dicœcious. Perianth of 6 linear-spatulate segments. Stamens 6, filaments longer than the perianth. Ovary 3-celled, styles 3. Fruit an ovoid, 3-angled, many-seeded capsule.*

1. **C. carolinianum, Willd.** UNICORN-ROOT, DEVIL'S BIT. Stem furrowed, staminate plants 1–2 ft. high, pistillate taller, often 3 ft. or more. Lower leaves obovate, clustered, the upper small and bract-like. Staminate racemes slender and drooping, the pistillate erect. Flowers short-pediceled. Capsule 3-valved, seeds linear-oblong, winged at the ends. On low ground.*

III. AMIANTHIUM, Gray.

Stem simple, glabrous, erect from a bulbous base. Leaves long and slender. Flowers white, in a simple terminal raceme, perfect. Perianth of 6 segments which are sessile and glandless. Stamens 6, inserted in the base of the perianth. Ovary 3-lobed, 3-celled, fruit a dehiscent, 3-lobed capsule, the lobes becoming awl-shaped by the persistent style bases; cells few-seeded.*

1. **A. muscætoxicum, Gray.** FLY POISON. Bulb ovoid or oblong. Stem somewhat angled below, 1–3 ft. high. Lower leaves strap-shaped, channeled, the upper small and bract-like. Raceme dense, cylindrical, pedicels from the axils of minute ovate bracts. Perianth segments ovate, white, becoming greenish, nearly as long as the slender stamens. Styles spreading. Capsule with divergent lobes; seeds ovoid, red. In rich woods.*

IV. UVULARIA, L.

Rather low plants with short rootstocks. Leaves alternate, broad, and parallel-veined. Flowers yellow or yellowish, drooping, borne singly at the end of the forking stem. Perianth of 6 similar and separate narrow spatulate sepals, each grooved and nectar-bearing inside toward the base. Stamens 6, with linear anthers, which are much longer than the filaments. Style 3-cleft. Pod 3-lobed, 3-celled, few-seeded.

1. **U. grandiflora.** LARGER BELLWORT. Leaves oblong, with the base clasping the stem so as to make it appear to run through the leaf a little way from the base; flowers greenish-yellow, 1½ in. long, anthers obtuse. A leafy plant, 1–2 ft. high.

2. **U. perfoliata.** MEALY BELLWORT. Leaves much as in the preceding species; flowers very pale yellow, with shining grains on the inner surfaces of the twisted sepals; anthers sharp-pointed; plant about ⅔ the size of the preceding.

V. OAKESIA, Watson.

Plants with much the aspect of the preceding genus, but with merely sessile leaves, triangular winged pods, and slender creeping rootstocks.

1. **O. sessilifolia.** WILD OATS, STRAW LILIES. Stem slender, zigzag. Leaves lance-oval, thin, smooth, pale beneath, 1–1½ in. long. Flower cream-color, nearly 1 in. long.

VI. HEMEROCALLIS, L.

Perennial, from a fascicle of fleshy roots. Stem erect, branched, smooth. Leaves mostly basal and linear. Flowers on branching scapes, large, yellow or orange, solitary or

corymbed, perianth funnel-form, with a spreading limb much longer than the tube. Stamens 6, inserted in the top of the tube, shorter than the lobes, curved upward. Ovary 3-celled, many-ovuled, style longer than the stamens, curved upward, stigma knobbed. Fruit a 3-celled, 3-angled capsule.*

1. **H. fulva, L.** DAY LILY. Scapes stout, branched above, with a few bract-like leaves, smooth, 3–5 ft. high. Leaves very long, strap-shaped, acute, channeled. Flowers short-pediceled, tawny-yellow, perianth lobes oblong, netted-veined, lasting only one day. Introduced from Asia and common in old gardens.*

VII. ALLIUM, L.

Stemless herbs from coated bulbs with the characteristic odor of onions. Bulbs solitary or clustered. Leaves narrowly linear or slender-tubular, with a bloom. Flowers small on slender pedicels, in terminal umbels on naked scapes, the umbels often bracted or enclosed in a spathe. Perianth 6-parted, persistent; stamens 6, inserted on the base of the perianth, filaments filiform or dilated below. Ovary sessile, 3-celled. Style thread-like, jointed; stigma entire. Fruit a 3-celled, 3-valved, few-seeded capsule. Flowers sometimes changed into bulblets.*

1. **A. canadense, L.** MEADOW GARLIC. Bulbs ovoid, the outer coats of white and thin, dry, netted fibers. Leaves narrowly linear, flat, or concave above. Scape cylindrical, 1 ft. high. Bracts of the umbel 2–3, ovate, acuminate; umbel consisting mostly of sessile bulblets. The few flowers long-pediceled, rose-colored. Perianth about as long as the stamens. Filaments dilated below. Capsule shorter than the perianth, 6-toothed, ovules 2 in each cell. On moist soil.*

2. **A. striatum, Jacq.** STRIPED WILD ONION. Bulbs clustered, outer coat membranaceous. Leaves linear, concave, striate on the back. Scape 6–12 in. high. Umbel 3–10-flowered, bracts 2, pedicels 1–2 in. long. Perianth nearly white, longer than the stamens, the outer segments green-keeled on the back. Capsule not toothed, seeds several in each cell. Low pine barrens.*

3. **A. vineale, L.** FIELD GARLIC. Bulb mostly solitary. Leaves cylindrical, hollow, very slender. Scape slender, sheathed below the middle by the bases of the leaves. Umbels often crowded with bulblets. A troublesome weed in moist meadows and fields eastward, giving milk a strong flavor of onions or garlic.

VIII. LILIUM, L.

Perennial, from scaly bulbs, stem erect, leafy, usually tall and slender. Leaves sessile, scattered, or whorled. Flowers large, erect, or drooping. Perianth corolla-like, deciduous. Segments 6, spreading or recurved above, sessile or clawed, each with a nectar-bearing groove near the base. Stamens 6, elongated, anthers linear, versatile. Ovary 3-celled, many-ovuled, style long and slender, stigma 3-lobed. Fruit a 3-celled, dehiscent, many-seeded capsule.

1. **L. longiflorum, Thunb.** LONG-FLOWERED WHITE LILY. Stem 1–3 ft. high. Leaves thick, lanceolate, scattered. Flower single, pure white, funnel-shaped, 5–6 in. long. Var. **eximium,** the Easter lily, bears several very showy and sweet-scented flowers.

2. **L. philadelphicum, L.** WILD RED LILY. Stem 2–3 ft. high. Leaves linear-lanceolate, the upper ones generally whorled. Flower usually solitary (sometimes 2 or 3), erect, reddish-orange, with tawny or purplish spots inside. Sepals with claws. Dry or sandy ground, borders of thickets, etc.

3. **L. canadense, L.** WILD YELLOW LILY, MEADOW LILY. Stem 2–5 ft. high. Leaves lanceolate, 3-nerved, the margins and nerves roughish with short hairs, whorled. Flowers usually 3, sometimes more numerous, all nodding, on peduncles 3–6 in. long, yellow or orange, with dark-purple or brown spots inside. Sepals without claws, recurved. Moist meadows and borders of woods.

IX. FRITILLARIA, Tourn.

Leafy-stemmed perennials, from scaly or coated bulbs. Flowers single or several, nodding. Perianth bell-shaped, a nectar-bearing spot above the base of each division. Stamens as long as the petals.

1. **F. Meleagris, L.** GUINEA-HEN FLOWER. Stem 1 ft. high. Leaves linear, alternate, channeled. Flower usually single, large, purplish, checkered with blue and purple or yellow. Cultivated from Europe.

2. **F. imperialis, L.** CROWN IMPERIAL. Stem 3–4 ft. high. Leaves abundant in whorls about the middle or lower part of the stem, lanceolate or lance-oblong. Flowers several, large, yellow or red, in an umbel-like cluster beneath the terminal crown of leaves. Cultivated from Asia.

X. TULIPA, Tourn.

Stemless herbs from coated bulbs. Leaves sessile. Scape simple. Flower solitary, erect. Perianth bell-shaped. Stamens short, awl-shaped, with broadly linear anthers. Style short, stigma thick, 3-lobed. Ovary and pod triangular.

1. **T. gesneriana, L.** COMMON TULIP. Leaves 3–6, ovate-lanceolate, close to the ground. Flower large, on a smooth peduncle, color red, yellow, white, or variegated. Cultivated from Asia Minor. Many garden varieties exist.

XI. ERYTHRONIUM, L.

Nearly stemless herbs, arising from rather deeply buried bulbs. Leaves 2, long and smooth, with underground petioles. Scape arising from between the bases of the leaves. Flower commonly single, nodding.

1. **E. americanum, Ker.** YELLOW ADDER'S-TONGUE. Leaves mottled. Flowers handsome. Perianth light yellow, style club-shaped, stigmas united.
2. **E. albidum, Nutt.** WHITE DOG'S-TOOTH VIOLET. Leaves not much mottled. Perianth bluish-white. Stigmas 3, short and spreading.

XII. SCILLA, L.

Perennial stemless herbs from coated bulbs. Leaves linear. Flowers racemed on a scape, generally blue. Divisions of the perianth 1-nerved, parted almost to the base. Filaments 6, often broad at the base. Style slender, with a knob-like stigma. Ovary 3-angled, 3-celled.

1. **S. sibirica, Andr.** SIBERIAN SQUILL. Scapes 3–8 in. high, several from each bulb, 2–3-flowered. Leaves 2–4, narrowly strap-shaped. Flowers intense blue, short-peduncled, often nodding. Cultivated from Russia and Siberia.

XIII. CAMASSIA, Lindl.

Stemless herbs, from coated bulbs. Leaves linear. Flowers racemed, on a scape. Perianth of 6 blue or purple spreading sepals. Stamens with thread-like filaments, from the base of the perianth. Style thread-like, ending in a knobbed stigma. Capsule 3-angled, 3-celled, several-seeded.

1. **C. Fraseri, Torr.** WILD HYACINTH. Leaves keeled, weak, shorter than the scape. Flowers in a long-bracted raceme, pale blue. River bottoms and other damp, rich soil.

XIV. ORNITHOGALUM, Tourn.

Stemless herbs from coated bulbs. Leaves linear, fleshy. Scape erect. Flowers in corymbs or racemes, bracted. Perianth segments 6, white, nerved, persistent. Stamens 6, hypogynous, slender. Filaments flattened. Ovary sessile, 3-celled, few-ovuled. Fruit a roundish, 3-angled capsule, seeds black.*

1. **O. umbellatum, L.** STAR OF BETHLEHEM. Bulb ovoid, membranous-coated. Leaves numerous, linear, fleshy, mid-vein nearly white, as long as the scape. Scape slender, 6–12 in. high. Flowers opening in sunshine, long-pediceled. Bracts linear-lanceolate, about as long as the pedicels. Perianth segments oblong-lanceolate, white with a green stripe on the back, twice the length of the stamens. Introduced from Europe; very common about old gardens.*

XV. HYACINTHUS, L.

Stemless herbs from coated bulbs. Leaves linear, fleshy. Flowers in an erect spike, pediceled, bracted. Perianth tubular below, lobed and spreading above. Stamens short, included. Style short, stigma knobbed. Ovary 3-celled, many-ovuled.*

1. **H. orientalis, L.** HYACINTH. Leaves lance-linear, thick and fleshy, smooth. Scape erect, many-flowered. Segments united about half their length, white, blue, or red. Filaments very short. Ovary rarely maturing seed. Common in cultivation.*

XVI. YUCCA, L.

Plants with woody and leafy stems. Leaves numerous, rigid, spine-pointed, persistent. Flowers in large terminal racemes or panicles, bracted, nodding. Perianth bell-shaped, segments 6, nearly alike, deciduous. Stamens 6, filaments thickened above, often papillose. Anthers small. Ovary sessile, 3-celled, or becoming 6-celled, 3-angled, many-ovuled. Fruit an oblong, 3-angled, many-seeded, dehiscent capsule, or fleshy and indehiscent.*

1. **Y. filamentosa, L.** SPANISH DAGGER. Stem stout, 4–12 in. high. Leaves linear or linear-lanceolate, slender-pointed, narrowed above the spreading and clasping base, spreading or recurved, smooth, with loose, thread-like filaments on the margins. Panicle elongated, with bract-like leaves on the scape, widely branched, downy-hairy above, 3–6 ft. high. Perianth white, bell-shaped, 2 in. wide. Capsule oblong, angles rounded, sides furrowed, at length 3-valved and dehiscent. In sandy soil, and often cultivated for ornament.*

XVII. ASPARAGUS, Tourn.

Stem from fleshy fibrous roots, erect, branched, branches slender, with thread-like branchlets in the axils of scales which take the place of leaves. Flowers small, solitary, or racemed. Perianth 6-parted, segments distinct or slightly united. Stamens 6, perigynous, filaments thread-like. Ovary 3-celled, 6-ovuled, style short, slender, stigmas 3, recurved. Fruit a berry.*

1. **A. officinalis, L.** ASPARAGUS. Stem succulent and simple, with fleshy scales when young, becoming taller, more woody and widely branched when old. Flowers axillary, solitary, or 2 or 3 together on slender, jointed, drooping pedicels, greenish, segments linear. Berry red, few-seeded. Introduced from Europe, common in cultivation, and often escaped.*

XVIII. SMILACINA, Desf.

Perennial, simple-stemmed herbs, with rootstocks. Leaves usually sessile, nerved, alternate. Flowers white, in a terminal raceme. Perianth spreading, 6-parted. Stamens 6, springing from the base of the perianth. Filaments slender. Anthers short, facing inward. Ovary 3-celled, 6-ovuled. Style short and stout, with a somewhat 3-lobed stigma. Fruit a 1–2-seeded berry.

1. **S. racemosa, Desf.** FALSE SPIKENARD. A showy plant with curved stem 1–3 ft. high, downy throughout. Leaves abundant, oval or ovate-lanceolate, taper-pointed. Flowers small, in a compound raceme. Berries pale red, speckled with dark red or purple. Moist thickets.

2. **S. stellata, Desf.** Plant 1 ft. or less in height, nearly smooth. Leaves broadly lanceolate, acute, clasping. Flowers few, larger than in No. 1, in a simple raceme. Berries very dark red. Along river banks.

XIX. MAIANTHEMUM, Wigg.

Stem low. Leaves 2–3, lanceolate or ovate, with a heart-shaped base. Flowers small, white, solitary, or in a simple raceme. Perianth 4-parted. Stamens 4. Ovary 2-celled. Stigma 2-lobed.

1. **M. canadense, Desf.** TWO-LEAVED SOLOMON'S SEAL, WILD LILY-OF-THE-VALLEY. Plant 3–6 in. high. Leaves very short-petioled. Fruit a globular or ovoid berry, whitish, with brownish-red blotches. Woods and shaded banks N.

XX. STREPTOPUS, Michx.

Herbs with forking stems from a creeping rootstock. Leaves clasping. Flowers small, borne singly or in pairs on peduncles which arise above the leaf-axils and which are sharply bent or twisted near the middle. Anthers arrow-shaped. Ovary 3-celled, ripening into a red, many-seeded berry.

1. **S. amplexifolius, D. C.** LIVER-BERRY. Stem smooth, 2 ft. or more high. Leaves smooth-margined. Flowers greenish-white. Damp woods.

2. **S. roseus, Michx.** LIVER-BERRY, JACOB'S LADDER. Branches with a few bristly hairs. Lower leaves margined with fine bristles. Flowers reddish or purplish. Cold, damp woods N.

XXI. POLYGONATUM, Tourn.

Rootstock creeping, jointed, scarred. Stems simple, erect, scaly below, leafy above. Leaves alternate, oval, or oblong. Flowers on axillary, 1–4-flowered, drooping, jointed peduncles. Perianth tubular, 6-cleft. Stamens 6, included, inserted about the middle of the tube. Anthers arrow-shaped. Ovary 3-celled, many-ovuled, style slender, stigmas knobbed or 3-lobed. Fruit a few-seeded berry.*

1. **P. biflorum, Ell.** HAIRY SOLOMON'S SEAL. Stem simple, erect, arched, nearly naked below, 1–2 ft. high. Leaves 2-ranked, sessile or clasping, 3–7-nerved, smooth above, pale and downy beneath. Peduncles short, 1–4, often 2-flowered. Perianth greenish, 1–2 in. long. Filaments thread-shaped, roughened. Berry dark blue. Shady banks.*

2. **P. giganteum, Dietrich.** SMOOTH SOLOMON'S SEAL. Stem simple, stout, curving above, 3–8 ft. high. Leaves lanceolate to ovate, many-nerved, partly clasping, smooth on both sides. Peduncles nearly half as long as the leaves, 2–6-flowered. Perianth greenish-yellow, $\frac{3}{4}$ in. long. Filaments smooth. Berry blue, $\frac{1}{2}$ in. in diameter. In rocky woods and along streams.*

XXII. CONVALLARIA, L.

Low, smooth, stemless, perennial herbs. Leaves 2, oblong, with long petioles, from a slender, creeping rootstock. Scape slender, angled, enclosed at the base by the leaf-stalks. Flowers racemed, white, drooping. Perianth bell-shaped, with recurved lobes. Stamens borne on the base of the perianth. Ovary 3-celled, ripening into a few-seeded red berry.

1. **C. majalis, L.** LILY-OF-THE-VALLEY. A familiar garden flower, cultivated from Europe, and also found wild in mountain woods from Virginia to Georgia.

XXIII. TRILLIUM, L.

Low herbs with the stem springing from a short rootstock. Leaves 3, large, netted-veined, in a whorl. Flower large, terminal. Perianth of 6 parts, the 3 sepals unlike the 3 petals in color and in texture. Stamens 6, with the linear anthers usually opening inward, longer than the filaments. Stigmas 3, sessile, spreading at the tips. Ovary 3 or 6-angled, 3-celled, many-seeded. Fruit a roundish, many-seeded purple berry.

1. **T. sessile, L.** Rootstock erect or ascending, corm-like. Stem slender, 1–8 in. high. Leaves broadly oval, obtuse or acute at the apex, rounded and sessile at the base, 3–5-nerved, smooth, bright green, not mottled. Flowers sessile, sepals lanceolate, $\frac{2}{3}$–1 in. long, petals purple, elliptical, about the length of the sepals. Stamens half the length of the petals. Styles elongated, straight. In rich woods.*

2. **T. Underwoodii, Small.** UNDERWOOD'S WAKE-ROBIN. Rootstock horizontal, stem stout, 4–12 in. high. Leaves ovate-lanceolate to broadly ovate, acute or short taper-pointed at the apex, rounded and sessile at the base, wavy on the margins, 3–5-nerved, smooth, prominently mottled with different shades of green. Flowers sessile. Sepals lanceolate, 1$\frac{1}{2}$–2 in. long, often purplish green. Petals purple, lanceolate to oblanceolate, 2–3 in. long. Stamens $\frac{1}{4}$–$\frac{1}{3}$ the length of the petals. Style very short, stigmas recurved. Fruit an ovoid berry. In rich woods.*

3. **T. erectum, L.** SQUAWROOT, BENJAMIN. Rootstock rather upright, large and stout. Leaves broadly diamond-shaped, tapering to a short point. Pedicel 1–3 in. long, not quite erect. Petals ovate to lanceolate, much broader than the sepals, of a rich brownish-purple or sometimes white or pale. Stigmas distinct, stout, and spreading. The disagreeable scent of the flower has given rise to several absurd popular names for it. In rich woods.

4. **T. grandiflorum, Salisb.** LARGE-FLOWERED WAKE-ROBIN. Rootstock horizontal, stem slender, 12–18 in. high. Leaves rhombic-ovate, taper-pointed at the apex, rounded and sessile or slightly peduncled at the base, smooth and with a bloom, 5–7-nerved, bright green. Peduncle longer than the erect or slightly declined flower. Sepals lanceolate-acute, 1–1½ in. long. Petals white, fading to pink, longer than the sepals. Stamens less than half the length of the petals. Style short, stigmas recurved. Fruit a black, roundish berry. In rich woods.*

5. **T. nivale, Riddell.** DWARF WHITE TRILLIUM. Plant 2–4 in. high. Leaves petioled, oval to ovate. Flower white, erect. Petals ½–1¼ in. long, ovate-spatulate. Rich, damp woods, blooming with the very earliest spring flowers.

6. **T. erythrocarpum, Michx.** PAINTED TRILLIUM. Plant 8–12 in. high. Rootstock oblique to the rest of the stem, rather small; roots long and fibrous. Leaves ovate, taper-pointed. Petals white, penciled at the base, with purple stripes, lance-ovate, somewhat recurved, wavy. Cold woods, especially N.

XXIV. SMILAX, Tourn.

Mostly woody vines, usually with prickly stems, climbing by tendrils. Rootstock often large and tuberous. Leaves alternate, prominently nerved, netted-veined, petioled, stipules replaced by persistent tendrils. Flowers regular, dicœcious, small, greenish, in axillary umbels. Perianth bell-shaped, segments 6. Stamens 6, distinct. Ovary 3-celled, 3–6-ovuled, stigmas 1–3, sessile or nearly so. Fruit a 1–6-seeded globose berry.

1. **S. herbacea, L.** CARRION-FLOWER. Stem herbaceous, erect, simple or branched, not prickly, 1–3 ft. high. Leaves few, ovate, acute, and mucronate at the apex, somewhat heart-shaped at the base, 5–7-nerved, thin, smooth above, downy below, the upper sometimes whorled and the lower bract-like ; petiole short. Peduncles as long as the leaves, growing from below the petiole. Umbel many-flowered, flowers carrion-scented. Berry blue-black, 2–4-seeded. Dry, fertile soil.*

2. **S. glauca, Walt.** GREEN-BRIER. Stem cylindrical, slender, with scattered prickles, branches angled, and usually without prickles. Leaves ovate or subcordate, pointed at the apex, mostly 5-nerved, smooth, white beneath, with a bloom, margin entire. Peduncle flattened, 2–3 times as long as the petiole, few-flowered. Berry black, 3-seeded. Margin of swamps.*

3. **S. Bona-Nox, L.** BAMBOO-VINE. Stem stout, cylindrical, or slightly angled, scurfy when young, armed with numerous stout prickles. Branches 4-angled, usually unarmed. Leaves triangular, ovate, or often halberd-shaped, 5–7-ribbed, smooth on both sides and often discolored, margins usually fringed with fine prickles. Peduncles twice as long as the petioles, flattened. Umbels many-flowered, pedicels short. Berries 8–20 in a cluster, black, 1-seeded. In swamps and thickets.*

4. **S. Walteri, Pursh.** GREEN-BRIER. Stem low, with few prickles, 2–5 ft. long, branches slightly 4-angled, unarmed. Leaves oblong-lanceolate to oval, obtuse or acute at the apex, rounded or cordate at the base, 5-ribbed, smooth. Peduncles flattened, about as long as the petioles and pedicels. Berry bright red, ripening the first year. Wet pine barrens.*

5. **S. rotundifolia, L.** GREEN-BRIER, CAT-BRIER, DOG-BRIER, HORSE-BRIER, WAIT-A-BIT. Stem green, strong; branchlets, and sometimes the branches, 4-angled, armed with stout hooked prickles. Leaves ovate or round-ovate, with a slightly heart-shaped base and an abruptly pointed tip. Berries black, with a bloom. Thickets, the commonest species N. E.

11. AMARYLLIDACEÆ. AMARYLLIS FAMILY.

Mostly smooth perennial herbs, from bulbs. Leaves radical, with no distinction between petiole and blade. Flowers borne on a scape, nearly or quite regular. Stamens 6. Style 1. Tube of the 6-parted, corolla-like perianth adnate to the 3-celled ovary. Capsule 3-celled, several–many-seeded.

I. ZEPHYRANTHES, Herb.

Stemless, from a coated bulb. Leaves linear, fleshy. Scape erect, 1–few-flowered. Flowers large, erect, or declined, subtended by a 1–2-leaved spathe. Perianth 6-parted, naked in the throat, tube short, segments petal-like, spreading. Stamens free, anthers versatile. Ovary 3-celled, many-ovuled. Style

elongated, declined. Stigma 3-cleft. Fruit a many-seeded, 3-valved capsule, seeds black, compressed, or angled.*

1. **Z. Atamasco, Herb.** ATAMASCO LILY. Bulbs about 1 in. in diameter. Leaves narrow, concave above, smooth, usually longer than the scape. Scape 6–12 in. high, 1-flowered. Spathe 1-leaved, 2-cleft. Flowers 2–3 in. long, white, tinged with pink or purple, bell-shaped, short-peduncled. Stamens longer than the tube, shorter than the style. Capsule depressed-globose, seeds angled. In rich, damp soil, often cultivated.*

II. NARCISSUS, L.

Scapes with 1–several flowers from a thin, dry spathe. Flowers with a cup-shaped or other crown on the throat of the perianth; tube of the perianth somewhat cylindrical, the 6 divisions of the limb widely spreading. Stamens 6, inserted in the tube.

1. **N. Pseudo-narcissus, L.** DAFFODIL, DAFFY, EASTER-FLOWER. Scape short, bearing 1 large yellow flower; tube of perianth short and wide, crown with a crimped margin. Cultivated from Europe.
2. **N. Tazetta, var. orientalis.** CHINESE SACRED LILY. Bulb large, often with many smaller ones attached to its base. Scape 1 ft. or more high. Flowers several, umbeled, fragrant. Perianth white or nearly so, the crown rather spreading, finely scalloped, yellow or orange. Cultivated from China.
3. **N. poeticus, L.** POET'S NARCISSUS. Scape 1-flowered. Perianth pure white, the crown very narrow, edged with pink. Cultivated from S. Europe.

III. HYPOXIS, L.

Small, stemless herbs. Leaves grass-like, hairy, from a solid bulb. Scapes thread-like, few-flowered. Perianth 6-parted, wheel-shaped, the 3 outer divisions greenish on the outside, the whole perianth withering on the pod. Seeds numerous.

1. **H. erecta, L.** STAR-GRASS. Leaves longer than the scape, both sparsely set with long, soft hairs. Scape 3–8 in. high. Flowers 1–4, about $\frac{1}{2}$ in. across, yellow. Common in meadows and dry woods.

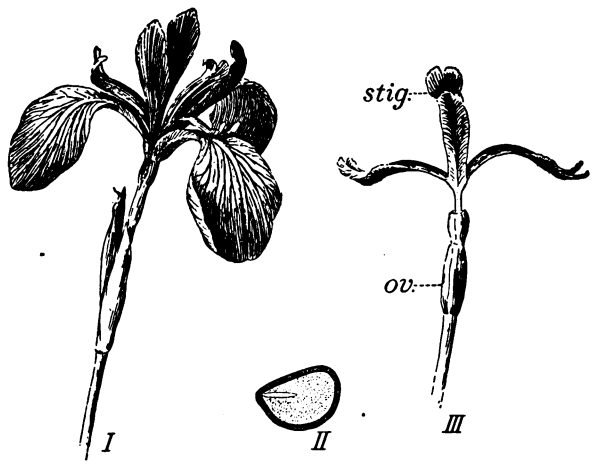


FIG. 6. — Iris.

I, flower; II, seed, longitudinal section; III, flower with outer segments of perianth removed; *stig.*, stigma, *ov.*, ovary.

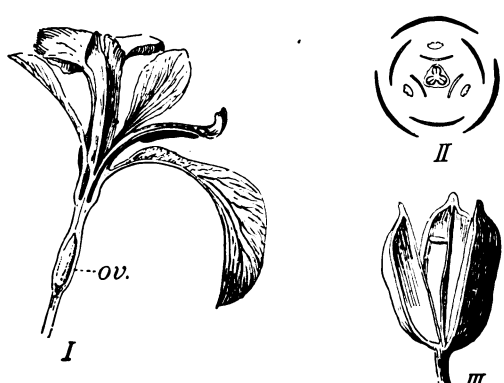


FIG. 7. — Iris.

I, flower, longitudinal section, *ov.*, ovary; II, diagram, showing stigmas opposite the stamens; III, capsule, splitting between the partitions.

12. IRIDACEÆ. Iris Family.

Perennial herbs from bulbs, corms, or rootstocks. Leaves 2-ranked, equitant. Flowers perfect, regular or irregular, each subtended by two bracts. Perianth 6-parted, the tube adherent to the ovary, the segments in 2 series of 3 each, equal, or the inner ones smaller. Stamens 3, distinct or united, opposite the outer segments. Ovary forming a 3-celled, 3-angled, 3-valved, many-seeded, dehiscent capsule.*

I. CROCUS, L.

Leaves radical. Flowers sessile on the corm. Tube of the perianth very long and slender, its divisions all alike or nearly so. Stigmas 3-cleft.

1. **C. vernus.** Spring Crocus. Leaves linear. Stigmas short. Flowers white, blue, or purple. Our earliest garden flower. Cultivated from Europe.

II. IRIS, Tourn.

Rootstock thick, creeping, branching, horizontal, sometimes tuberous. Stems erect, simple, or branched. Leaves linear or sword-shaped. Flowers showy, epigynous, the outer perianth segments spreading or recurved, often bearded within, the inner segments usually smaller and erect. Stamens inserted in the base of the outer segments. Style deeply 3-parted, the divisions broad and petal-like, covering the stamens. Fruit an oblong or oval, 3 or 6 angled, many-seeded capsule.*

1. **I. versicolor, L.** Large Blue Flag. Rootstock thick, horizontal. Stem cylindrical, smooth, simple or branched, leafy, 2–3 ft. high. Leaves linear, sword-shaped, finely nerved, with a bloom, the lower 1½–2 ft. long, the upper shorter. Bracts longer than the pedicels. Flowers terminal, single, or few together, blue variegated with white, yellow, and purple, perianth segments not bearded, the inner ones smaller. Ovary 3-angled, longer than the inflated perianth tube. Capsule oblong, slightly lobed, seeds 2 rows in each cell. In wet places.*

2. **I. germanica, L.** Fleur-de-lis. Rootstock thick, matted. Stem stout, branched, leafy, 2–3 ft. high. Leaves strap-shaped,

acute, erect, shorter than the stem, bracts scarious. Flowers sessile, large and showy, blue, variegated with white and yellow, sometimes nearly all white, outer segments large, recurved, bearded, the inner narrower, erect, or arched inward. Introduced from Europe; common in gardens and naturalized in many places.*

3. **I. fulva, Ker.** YELLOW FLAG. Rootstock fleshy. Stem simple or branched, grooved, 1-angled below, bearing 2–3 leaves, 2–3 ft. high. Leaves linear, sword-shaped, with a bloom, shorter than the stem, bracts small. Pedicels short, flowers axillary and terminal, dull yellow or reddish-brown, variegated with blue and green, perianth segments not bearded. Style branches but little exceeding the stamens, ovary about as long as the inflated perianth tube. Capsule ovate, 6-angled. Swamps and wet places.*

III. SISYRHINCHIUM, L.

Small, grass-like perennials. Stems erect, flattened, or winged. Roots fibrous. Leaves linear or lanceolate. Flowers small, blue, quickly withering, in terminal 2-bracted umbels. Perianth corolla-like, of 6 bristle-pointed segments, tube nearly or wholly lacking. Stamens 3, completely monadelphous. Stigmas 3, thread-like. Fruit a nearly globular 3-angled capsule. Species too difficult for the beginner.

13. ORCHIDACEÆ. ORCHIS FAMILY.

Perennial herbs with simple stems, often arising from bulbs or tubers. Leaves simple, usually alternate and entire. Flowers perfect, generally showy, often extraordinarily irregular. Perianth of 6 divisions, adnate to the 1-celled ovary. Stamens 1 or 2, united with the pistil; pollen of comparatively few grains held together in masses by cobweb-like threads. Ovary 1-celled, containing many (sometimes more than a million) very minute ovules.

The family is a difficult one, and most of the genera are so rare that specimens should not be collected in large numbers for class study. Two of the most familiar genera are *Cypripedium*, or lady's slipper, and *Spiranthes*, or lady's tresses. Many of the genera are tropical air-plants like Part I, Fig. 13.

SUBCLASS II. — DICOTYLEDONOUS PLANTS.

Stems composed of bark, wood, and pith; the fibro-vascular bundles in rings; in woody stems which live over from year to year, the wood generally in annual rings, traversed at right angles by medullary rays. Leaves netted-veined. Parts of the flower usually in fours or fives. Cotyledons 2 (rarely none).

14. SALICACEÆ. Willow Family.

Dœcious trees or shrubs, with flowers in catkins (Ch. XIII), destitute of floral envelopes. Fruit a 1-celled pod, with numerous seeds, provided with rather long and silky down, by means of which they are transported by the wind.

I. POPULUS, Tourn.

Trees with prominent scaly buds, twigs more or less angled. Leaves usually long-petioled.

Flowers borne in long, drooping catkins, which appear before the leaves; scales of the catkins irregularly cut toward the tip. Stamens 8–30 or more. Stigmas 2–4. Capsules opening early by 2 to 4 valves.

1. **P. tremuloides, Michx.** American Aspen, Quaking Asp. A tree 20 to 60 ft. high, with greenish-white bark; leaves roundish, heart-shaped, abruptly pointed, with small regular teeth. Leaf-stalk long, slender, and flattened at right angles to the broad surfaces of the leaf, causing it to sway edgewise with the least perceptible breeze. Common especially N.

2. **P. grandidentata, Michx.** Large-toothed Poplar. A tree 60 to 80 ft. high, with rather smooth gray bark; leaves 3–5 in. long, roundish ovate and irregularly sinuate-toothed; when young completely covered with white silky wool, which is shed as soon as the leaf matures. The petiole is somewhat flattened, but not nearly as much so as that of the preceding species. Rich woods N.

3. **P. heterophylla, L.** Swamp Poplar. Branches only slightly angled. Leaves ovate, mostly obtuse at the apex, rounded or subcordate at the base, serrate with obtuse teeth, densely woolly when

young, but becoming smooth with age; petioles cylindrical. Pistillate catkins smooth, erect, or spreading, loosely flowered. Capsule ovoid, usually shorter than the pedicel. Common in river swamps. A large tree with soft light wood, which is often used in making cheap furniture.*

4. **P. monilifera, Ait.** COTTONWOOD. A large and very rapidly growing tree, 75 to 100 or more feet in height, often with a markedly excurrent trunk. Leaves large and broadly triangular, with crenate-serrate margins and long, tapering acute tips; petioles long and considerably flattened. The numerous pediceled capsules are quite conspicuous when mature, and the air is filled with the downy seeds at the time when the capsules open. Common W., especially along streams and planted as a shade-tree.

II. SALIX, Tourn.

Shrubs or trees, branches usually very slender. Buds with single scales. Leaves usually long and narrow; stipules sometimes leaf-like or often small and soon deciduous. Bracts of the catkins entire; staminate catkins erect or drooping, staminate flowers with 2–10, mostly 2, distinct or united stamens. Pistillate catkins usually erect, flowers with a small gland on the inner side of the bract, stigmas short, 2-lobed. Capsule 2-valved.*

1. **S. nigra, Marsh.** BLACK WILLOW. Leaves elliptical or narrowly lanceolate, acute at each end, serrate, short-petioled, downy when young and becoming smooth with age, 2–3 in. long; stipules persistent or deciduous. Staminate catkins 1–2 in. long; the pistillate 2–4 in. long. Stamens 3–7, distinct, filaments soft, hairy below. Capsule twice the length of the pedicel, ovate, taper-pointed, pointed by the prominent style. A small tree with very brittle branches. Along streams and borders of marshes.*

2. **S. babylonica, Tourn.** WEEPING WILLOW. Leaves narrowly lanceolate, taper-pointed, serrate, slightly downy when young and becoming smooth with age, green above, pale beneath, often 5–7 in. long, petioles short, glandular. Catkins on short lateral branches. Stamens 2. Style almost none. Capsule sessile, smooth. Introduced and cultivated for ornament, becoming a large tree.*

[Some 20 species of willow are found growing wild in the northeastern and north central states, but they are very hard, even for botanists, to identify.]

15. MYRICACEÆ. Bayberry Family.

Shrubs with alternate, simple, resinous-dotted leaves; monœcious or dicœcious. Flowers in short, bracted catkins, perianth none. Staminate flowers 2–10, stamens inserted on the receptacle. Pistillate flowers surrounded by 2–6 scales. Ovary 1-celled, style short, stigmas 2.

I. MYRICA, L.

Shrubs or small trees with the branches clustered at the end of the growth of the previous season. Leaves short-petioled, entire, lobed or toothed, the margin usually revolute, without stipules. Perianth none. Staminate flowers in oblong or cylindrical catkins, stamens 2–10, with the filaments united below. Pistillate flowers surrounded by a cup of 2–6 scales, ovary solitary, becoming a 1-celled, roundish stone-fruit or nut, often covered with waxy grains. Whole plant usually fragrant.*

1. **M. cerifera, L.** Waxberry, Bayberry. A spreading shrub or small tree; young branches downy. Leaves lanceolate or oblong-lanceolate, entire or sometimes serrate near the mostly obtuse apex, smooth or downy on the veins beneath, tapering into a short petiole. Flowers mostly dicœcious. Staminate catkins numerous, stamens 4. Pistillate catkins small, bracts slightly 3-lobed, scales of the ovary 4, fringed with hairs; stigmas 2. Fruit very abundant, incrusted with white wax, $\frac{1}{8}$–$\frac{1}{6}$ in. in diameter, sometimes persistent for 2 or 3 years. Common on wet soils, especially near the coast.*

2. **M. asplenifolia, Endl.** Sweet Fern. A shrub 2 ft. or less in height, with brown twigs. Leaves fern-like, linear-lanceolate, 20–30-lobed, 3–5 in. long and very fragrant. Often monœcious. Staminate catkins cylindrical. Pistillate catkins globular. Ovary surrounded by 8 long, linear, awl-shaped, hairy and glandular scales which encircle the ripened fruit. Nut nearly ovoid, smooth, small, but eaten by children.

16. JUGLANDACEÆ. Walnut Family.

Trees with alternate, odd-pinnate leaves without stipules. Flowers monœcious, the staminate in long and drooping catkins, stamens few or many. Calyx 2–6-parted. Fertile

flowers solitary or in small clusters. Calyx 3–5-lobed, minute petals sometimes present. Ovary 1-celled or incompletely 2–4-celled. Fruit with a dry husk enclosing a bony nut.*

I. JUGLANS, L.

Staminate catkins cylindrical, solitary, borne on wood of the previous year, stamens numerous, filaments short, calyx 4–6-parted. Pistillate flowers single or a few together on a short peduncle at the base of the growth of the season. Calyx 4-parted. Petals 4, minute, adnate to the ovary. Styles 2, short, plumose. Fruit large, roundish or oval, husk fibrous-fleshy, becoming dry, indehiscent, nut bony, very rough.*

1. **J. nigra, L.** BLACK WALNUT. Leaflets 13–21, ovate-lanceolate, serrate, taper-pointed, somewhat cordate or oblique at the base, nearly smooth above, downy beneath, petioles minutely downy. Fruit usually single, roundish, about 2 in. in diameter. On rich soil, rare near the coast. One of the most valuable of our native trees, the wood being very durable and highly prized for cabinet work.*

2. **J. cinerea, L.** BUTTERNUT. Leaflets 15–19, ovate-lanceolate, taper-pointed at the apex, rounded or slightly unsymmetrical at the base, serrate, downy beneath; petioles, branchlets, and fruit clothed with short, sticky hairs. Fruit often somewhat in clusters, oblong, large. More common northward. Wood less valuable and nut less oily than the black walnut. The English walnut (*J. regia*) is occasionally seen in cultivation. It has 7–11 leaflets and a nearly smooth nut.*

II. CARYA, Nutt.

Leaflets serrate; staminate catkins usually in threes on a common peduncle, or sometimes sessile at the base of the growth of the season; calyx 2–3-parted, stamens 3–10, filaments short. Pistillate flowers 2–5 in terminal clusters, calyx 4-parted, petals none, styles 2 or 4, fringed. Fruit somewhat globular, husk separating more or less completely into 4 valves. Nut smooth or angled.*

1. **C. olivæformis, Nutt.** PECAN. A large tree with rough gray bark; young twigs and leaves downy, nearly smooth when mature. Leaflets 11–15, oblong-lanceolate, acuminate, serrate, scythe-shaped. Staminate catkins nearly sessile, 5–6 in. long. Husk thin nut oval

or oblong, thin-shelled. River bottoms. Rarely native east of the Mississippi River, but widely planted for its fruit.*

2. **C. alba, Nutt.** SHELLBARK HICKORY. A large tree with bark scaling off in long plates, young twigs and leaves downy, becoming smooth with age. Leaflets 5, the lower ones oblong-lanceolate, the upper one longer and obovate, taper-pointed at the apex, narrowed to the sessile base. Inner bud-scales becoming large and conspicuous. Staminate catkins in threes. Fruit globose, husk thick, splitting into four sections, nut white, compressed, 4-angled, pointed, thin-shelled. On rich soil. More common N. Wood strong and elastic, but not durable when exposed.*

3. **C. sulcata, Nutt.** BIG SHELLBARK, KING NUT, BULL NUT. A tree 70–90 ft. high, with shaggy bark. Leaflets 7 or 9, the terminal one nearly sessile. Fruit large, ovoid or nearly so, 4-grooved toward the outer end, the husk very thick, nut pointed at each end, 1½–2 in. long, thick-shelled, with a very sweet kernel. Wood hard and heavy. Common in rich, damp soil W.

4. **C. amara, Nutt.** PIGNUT, SWAMP HICKORY. A medium-sized tree, with rather smooth bark. Leaflets 7–11, lanceolate or oblong-lanceolate. Fruit not large, husk thin, nut globular, with a short point, very thin-shelled, kernel extremely bitter. Moist soil, common in the Middle States.

17. BETULACEÆ. BIRCH FAMILY.

Trees or shrubs, with alternate, simple, petioled leaves with usually deciduous stipules. Flowers monœcious in cylindrical or subglobose catkins, staminate catkins drooping; flowers 1–3 in the axil of each bract, calyx none, or membranous and 2–4-parted; stamens 2–10, distinct. Pistillate catkins drooping, spreading, or erect and spike-like; flowers with or without a calyx, ovary solitary 1–2-celled, ovules 1–2 in each cell. Fruit a 1-celled nut or key.*

I. CARPINUS, L.

Trees with thin, straight-veined leaves, which are folded in the bud. Flowers appearing before the leaves; staminate flowers in slender drooping catkins, sessile at the end of the growth of the previous season; stamens 3–12, subtended by a bract, filaments forked, anthers hairy. Pistillate catkins

spike-like, each pair of flowers subtended by a deciduous bract, and each flower by a persistent bractlet which becomes large and leaf-like in fruit; ovary 2-celled, 2-ovuled; stigmas 2, thread-like. Fruit a small angular nut.*

1. **C. caroliniana, Walt.** HORNBEAM. A small tree with smooth and close gray bark; twigs slender. Leaves ovate-oblong, acute or taper-pointed, sharply and doubly serrate, the straight veins terminating in the larger serrations; downy when young and soon becoming smooth. Staminate catkins 1–1½ in. long. Pistillate catkins long-peduncled, 8–12-flowered; bractlets becoming nearly 1 in. long, cut-toothed, the middle tooth much longer than the others. In rich, moist woods. Often known as "blue beech" and "iron-wood."*

II. OSTRYA, Micheli.

Small trees with gray bark and very hard wood. Leaves open and concave in the bud and somewhat plaited on the veins. Staminate flowers on slender, drooping catkins, sessile at the end of the growth of the previous season; stamens 3–12, subtended by a bract, filaments forked, anthers hairy. Pistillate flowers surrounded by a tubular bractlet which becomes large and bladder-like at maturity. Fruit a small, pointed, smooth nut; mature catkins hop-like.*

O. virginica, Willd. A small tree with brownish, furrowed bark; leaves ovate, acute, doubly serrate, often inequilateral at the base, short-petioled; staminate and fertile catkins 2–3 in. long. In rich woods. Often known as "iron-wood" and "lever-wood."*

III. CORYLUS, Tourn.

Shrubs with prominently veined, cut-toothed leaves which are folded lengthwise in the bud. Flowers expanding before the leaves. Staminate flowers in slender, drooping catkins; stamens 8, anthers 1-celled. Fertile flowers several in a cluster or in very short catkins at the ends of the twigs of the season; ovary incompletely 2-celled, style short, stigmas 2, bractlets 2, becoming enlarged and enclosing the single bony nut at maturity.*

1. **C. americana, Walt.** HAZELNUT. A shrub 2–5 ft. high, young twigs and petioles covered with brownish, stiff hairs. Leaves not

very thin, round-cordate, acute or slightly taper-pointed, irregularly toothed, nearly smooth above, downy below. Involucre longer than the nut and partially enclosing it, glandular-hairy. Nut subglobose, pointed, edible. On rich soil, borders of meadows and fields, and in oak-openings.

2. **C. rostrata, Ait.** BEAKED HAZELNUT. A shrub 4–8 ft. high. Young twigs near ends smooth. Leaves thin, little, if at all, heart-shaped, doubly serrate or incised, taper-pointed, stipules linear-lanceolate. Involucre completely covering the nut and prolonged into a beak beyond it. Common N. [The latter species is not nearly as widely distributed as the former; they cannot be readily distinguished from each other until the fruit is somewhat mature. The principal points of difference discernible before the fruit is nearly mature are the hairy twigs of No. 1 and the smooth ones of No. 2, and the fact that No. 1 has buds rounded at the apex and more slender and longer staminate catkins, while No. 2 has buds acute at the apex and thicker and shorter staminate catkins.]

IV. BETULA, Tourn.

Trees with slender, aromatic twigs and thin, usually straight-veined leaves. Staminate catkins drooping, flowers usually 3 in the axil of each bract, stamens 4, short, anthers 1-celled. Pistillate catkins erect, flowers 2 or 3 in the axil of each bract; ovary sessile, 2-celled, styles 2; bracts 3-lobed; perianth none. Nut broadly winged.*

1. **B. nigra, L.** RIVER BIRCH, RED BIRCH. A medium-sized tree with reddish-brown bark. Leaves rhombic-ovate, acute at the apex, acute or obtuse at the base, sharply and doubly serrate, white-downy below, becoming smoother with age, petioles short. Staminate catkins 2–3 in. long. Pistillate catkins 1–1½ in. long, peduncles short, bracts nearly equally 3-cleft, woolly. River banks, especially S. and W.*

2. **B. lenta, L.** CHERRY BIRCH. Leaves ovate or oblong-ovate, acute, heart-shaped, finely and doubly serrate, silky when young; petioles about ½ in. long. Staminate catkins clustered, 3–4 in. long. Pistillate catkins sessile, about 1 in. long, cylindrical bracts spreading, acute, smooth. River banks, especially N. A large tree with aromatic twigs. The oil contained in the bark and twigs is distilled and used as a substitute for wintergreen.*

3. **B. populifolia, Ait.** GRAY BIRCH. A tall shrub or slender, straggling tree, 15–30 ft. high, seldom growing erect, often several trunks springing from the ground almost in contact and slanting away from each other. Leaves triangular, with a long taper point

and truncate base, unevenly twice serrate, with rather long, slender petioles, which allow the leaves to quiver like those of the aspen. Bark scaling off in white strips and layers. but not in nearly as large sheets as that of the rarer canoe birch (*B. papyrifera*). The commonest birch of New England.

4. **B. alba, L.** EUROPEAN WHITE BIRCH, CUT-LEAVED BIRCH. A tree 50 to 60 ft. high, often with drooping branches. Leaves triangular-ovate, truncate, rounded or somewhat heart-shaped at the base, not strongly taper-pointed except in the cut-leaved form. Commonly cultivated from Europe. Resembles No. 3, but has whiter bark and (the weeping form) much more slender branches.

V. ALNUS, Tourn.

Shrubs or small trees. Leaves petioled, serrate. Flower-buds stalked, appearing the previous season; staminate catkins racemed, drooping, flowers 3–6 in the axil of each bract, subtended by 1–2 bractlets, perianth 4-parted, stamens 4, fila-

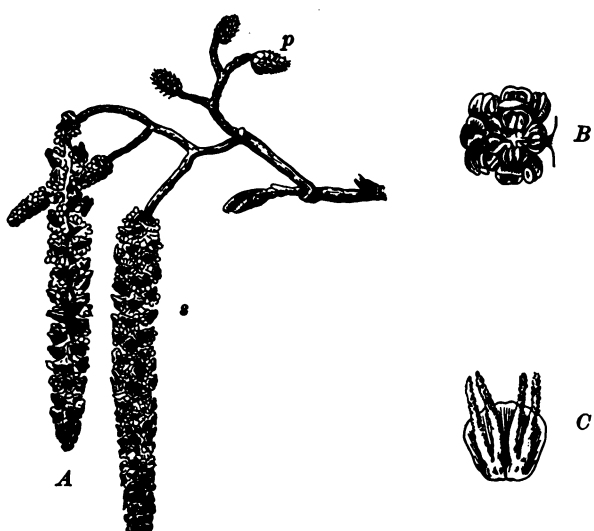


FIG. 8.—*Alnus glutinosa.*

A, a flowering twig; *s*, staminate catkins; *p*, pistillate catkins; *B*, a group of staminate flowers, enlarged; *C*, two pistillate flowers, enlarged.

ments short. Pistillate catkins erect; flowers 2–3 in the axil of each bract, perianth replaced by 2–4 minute bractlets which are adherent to the bract; ovary 2-celled, styles 2. Fruit a winged or angled nut; bracts of the pistillate flowers somewhat fleshy, persistent, becoming woody in fruit.*

1. **A. serrulata, Willd.** SMOOTH ALDER. A shrub or small tree with smooth bark. Leaves obovate, rounded or obtuse at the apex, acute at the base, sharply and minutely serrate, smooth above, downy beneath, petioled, stipules oval, deciduous. Staminate catkins 2–4 in. long; fruiting catkins ovoid, short-peduncled. Fruit ovate, wingless. Banks of streams and borders of marshes, ranging far S. Leaves often persistent during the winter.*

2. **A. incana, Willd.** SPECKLED ALDER. A shrub 8–20 ft. high. Leaves broadly oval or ovate, rounded at the base, sharply (sometimes doubly) serrate, white and usually downy beneath. Fruit round. Forming thickets by streams, very common N.

18. FAGACEÆ. BEECH FAMILY.

Trees or shrubs. Leaves alternate, simple, pinnately veined; stipules deciduous. Flowers monœcious, the staminate in heads, or in drooping, spreading, or erect catkins, calyx minute, petals none, stamens 4–20. Pistillate flowers solitary or in small clusters, each flower subtended by more or less united bracts which at maturity form a cup or bur, calyx minutely toothed, petals none; ovary 2–7-celled, but becoming 1-celled. Fruit a 1-seeded nut.*

I. FAGUS, Tourn.

Trees with smooth, close, ash-gray bark, and slender, often horizontal branches. Staminate flowers in long, slender-peduncled, roundish clusters, calyx bell-shaped, 4–6-cleft, stamens 8–12, anthers 2-celled; pistillate flowers solitary or more often in pairs, peduncled, surrounded by a 4-lobed involucre and numerous linear bracts; ovaries 3-celled with 2 ovules in each cell, but usually only 1 ovule matures in each ovary; styles 3, thread-shaped, fruit a thin-shelled, 3-angled nut.*

1. **F. ferruginea, Ait.** BEECH. Large trees. Leaves oblong-ovate, taper-pointed at the apex, serrate, straight-veined, very white-silky when young, nearly smooth with age. Involucre densely covered with short recurved spines. Nuts thin-shelled, edible. Common on damp soil everywhere. The wood is very hard, tough, and close-grained, and is especially valuable for the manufacture of small tools.*

2. **F. sylvatica, L.** The European beech is occasionally found planted as a shade-tree. The variety known as the copper beech is most usual, and is readily recognized by its dark, crimson-purple leaves.

II. CASTANEA, Tourn.

Trees or shrubs with rough, gray, rather close bark. Leaves straight-veined, undivided, prominently toothed. Flowers appearing later than the leaves. Staminate catkins erect or spreading, loosely flowered, flowers several in the axil of each bract, calyx 4–6-parted, stamens 8–16. Pistillate flowers at the base of the staminate catkin or in small separate clusters, usually 3 in each involucre; ovary 4-celled, surrounded by 5–12 abortive stamens. Fruit a 1-celled nut enclosed in the greatly enlarged and very prickly involucre.*

1. **C. sativa, Mill., var. americana, Wats.** AMERICAN CHESTNUT. A large tree, bark somewhat rough, and splitting into longitudinal plates. Leaves oblong-lanceolate, taper-pointed at the apex, usually acute at the base, coarsely and sharply serrate with ascending teeth, smooth, dark green above, lighter below; petioles stout, short. Staminate catkins erect, 6–10 in. long. Nuts usually 3 in each bur. Rich soil, especially N. Rarely found on soils containing much lime.*

2. **C. pumila, Mill.** CHINQUAPIN. A small tree or shrub. Leaves oblong, acute or obtuse at both ends, serrate with divergent teeth, dark green and smooth above, white-woolly below. Nuts solitary, nearly globular. Common southward in rich woods.*

III. QUERCUS, L.

Trees or shrubs with entire, serrate, or lobed leaves, which are often persistent. Staminate flowers in slender catkins, each subtended by quickly deciduous bracts, and consisting

of 3–12 stamens enclosed by a 4–8-parted perianth, often containing an abortive ovary. Pistillate flowers solitary or in small clusters, each consisting of a 3-celled ovary with 2 ovules in each cell, though rarely more than 1 ovule matures; styles short, erect, or recurved. Pistillate flowers surrounded by a scaly involucre which at maturity becomes a cup enclosing the base of the fruit or sometimes a large part of it. Fruit an ovoid or subglobose, 1-seeded, thin-shelled nut (acorn).

A. Fruit biennial; leaves entire or with bristle-pointed lobes.*

1. **Q. rubra, L.** Red Oak. A large tree. Leaves oval or obovate, green above, pale and slightly downy beneath, sinuses shallow and rounded, lobes 8–12, taper-pointed; petioles long. Cup saucer-shaped, with fine scales; acorn ovate or oblong, about 1 in. long. Common; wood not valuable; leaves turning red after frost and often remaining on the tree through the winter.*

2. **Q. coccinea, var. tinctoria, Gray.** Black Oak. A large tree with rough, dark brown outer bark and thick, bright yellow inner bark; leaves broadly oval, usually cut more than halfway to the midrib, sinuses rounded; lobes about 7, sharply toothed at the apex, smooth above, usually downy on the veins beneath; cup hemispherical or top-shaped, with coarse scales, short-peduncled, enclosing about half the roundish acorn. Common; wood not valuable, but the inner bark used for tanning and dyeing.*

3. **Q. falcata, Michx.** Spanish Oak. A small or medium-sized tree with leaves 3–5-lobed at the apex, obtuse or rounded at the base, grayish-downy beneath, lobes lanceolate and often scythe-shaped, sparingly cut-toothed. Cup top-shaped, with coarse scales, enclosing about half the nearly round acorn. Common in dry woods. Foliage quite variable in outline and lobing; bark valuable for tanning.*

4. **Q. nigra, L.** Black-jack Oak. A small tree; leaves obovate, usually with three rounded lobes at the apex, the lobes bristle-pointed, rounded, or slightly cordate at the base, rusty-pubescent beneath, shining above, coriaceous, short-petioled; cup top-shaped, short-peduncled, with coarse and truncate scales, enclosing about one-third of the oblong-ovate acorn. An almost worthless tree, its presence indicating a thin and sterile soil.*

5. **Q. Phellos, L.** Willow Oak. A tree of medium size, leaves lanceolate or elliptical, scurfy when young and becoming smooth with age; very short-petioled; cup shallow, sessile; acorn subglobose. Wet soil; often planted for shade.*

B. Fruit annual; leaves not bristle-tipped, though often mucronate.

6. **Q. alba, L.** WHITE OAK. A large tree with light gray bark. Leaves obovate-oblong, 3–9-lobed, lobes rounded and mostly entire, bright green above, paler below, short-petioled. Cup hemispherical, scales rough, woolly when young, but becoming smooth with age; acorn oblong-ovate, about 1 in. long. Common in damp soil; wood strong and durable; one of the most valuable timber trees.*

7. **Q. stellata, Wang.** POST OAK. A tree of medium size with rough gray bark. Leaves broadly obovate, deeply lyrate-pinnatified into 5–7 rounded, divergent lobes, upper lobes much the longer, smooth above, yellowish-downy beneath, petioles about 1 in. long. Cup hemispherical, nearly sessile; acorn ovoid, 2–3 times as long as the cup. On dry soil; wood hard and valuable.

8. **Q. macrocarpa, Michx.** BUR OAK. A medium-sized to very large tree, with roughish gray bark. Leaves obovate or oblong, lyrately and deeply sinuate-lobed, smooth above, pale or downy beneath. Cup very deep and thick, abundantly fringed about the margin, ¾ in. to 2 in. in diameter. Acorn, half or more [sometimes entirely] enclosed by the cup. Reaches its full size only on rich bottom lands S. and W., where it becomes one of the finest timber oaks. Wood very hard and heavy.

9. **Q. lyrata, Walt.** SWAMP OAK. A large tree with gray or reddish bark. Leaves obovate-oblong, deeply pinnatifid, lobes narrow, often toothed, thin, smooth above, white, densely woolly beneath. Cup round-ovate, scales cuspidate, enclosing nearly the whole of the depressed-globose acorn. On wet soil; wood strong and very durable.*

10. **Q. prinus, L.** SWAMP CHESTNUT OAK. A large tree with brown, ridged bark. Leaves oblong or oblong-lanceolate, rather obtuse, crenately toothed, minutely downy beneath, petioles slender, about 1 in. long. Cup hemispherical, peduncles longer than the petioles, scales acute, tubercular, appressed; acorn oblong, acute, 1 in. or less in length, edible. Common on low ground. Wood strong and valuable.*

11. **Q. Muhlenbergii, Engelm.** YELLOW CHESTNUT OAK. A tree of medium or large size with gray bark. Leaves oblong or oblanceolate, usually acute at the apex and obtuse or rounded at the base, coarsely and evenly toothed; veins straight, impressed above and prominent beneath; petioles slender. Cup hemispherical, sessile or short-peduncled, with flat scales, ½ in. broad, enclosing about half the ovoid acorn, which is ⅔–¾ in. long. Common on dry soil, wood close-grained, durable, and valuable.

12. **Q. virginiana, Mill.** LIVE OAK. A large tree with rough

gray or brown bark and a low, spreading top. Leaves leathery, evergreen, oblong or oblanceolate, often somewhat 3-lobed on young trees, margin rolled under, dark green and shining above, pale below; petioles short, stout. Fruit often in short racemes, cup top-shaped, scales closely appressed, hoary, peduncles ½–1 in. long; acorn from subglobose to oblong, the longer form occurring on the younger trees. On low ground near the coast; wood very hard and durable; valued for shipbuilding.*

19. ULMACEÆ. Elm Family.

Trees or shrubs with watery juice, alternate, simple, petiolate, serrate, stipulate leaves, which are usually 2-ranked; and small, perfect, or somewhat monœcious, apetalous flowers. Calyx of 3–9 sepals which are distinct or partly united, stamens as many as the sepals and opposite them. Ovary 1–2-celled, styles 2, spreading. Fruit a key, nut, or stone fruit.*

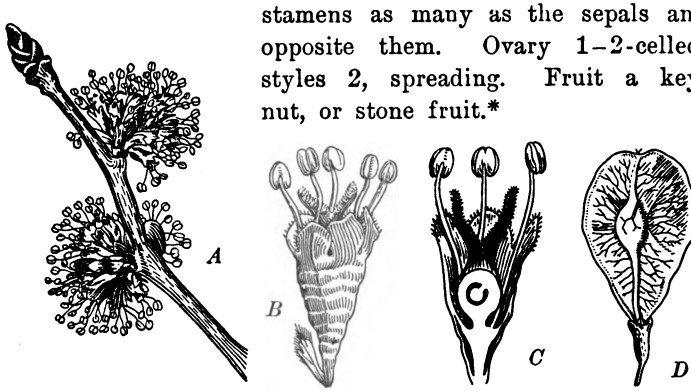


Fig. 9. — *Ulmus campestris.*

A, a flowering twig; *B*, a flower; *C*, longitudinal section of a flower; *D*, a fruit.

I. ULMUS, L.

Trees with straight-veined, unsymmetrical, doubly serrate leaves; stipules early deciduous. Flowers perfect, calyx bell-shaped, 4–9-cleft. Stamens slender, protruding. Ovary compressed, styles 2, spreading. Fruit membranaceous, flat, winged on the edge.*

1. **U. americana, L.** WHITE ELM. A large tree with gray bark, drooping branches, and smooth or slightly downy twigs. Leaves oval or obovate, abruptly taper-pointed at the apex, obtuse and oblique at the base, slightly rough above, soft downy or soon smooth beneath. Flowers in close fascicles, peduncles slender, smooth. Fruit oval or obovate, with 2 sharp teeth bending toward each other at the apex, wing reticulate-veined, downy on the margin. In moist, rich soil. A widely planted ornamental tree; wood strong but warping badly, and not durable when exposed.*

2. **U. alata, Michx.** WINGED ELM. A small tree with branches corky-winged. Leaves small, ovate-lanceolate, acute, sharply serrate, base nearly equal-sided, rough above, downy beneath, nearly sessile. Flowers in small clusters. Fruit oblong, downy on the sides, ciliate on the edges. On rich soil. Occasionally producing a second set of flowers and fruit from September to November.*

3. **U. fulva, Michx.** SLIPPERY ELM. A tree of medium size with rough downy twigs, and rusty, densely woolly bud-scales. Leaves large, thick, very rough above, downy beneath, ovate or obovate, taper-pointed at the apex, unsymmetrical, obtuse or somewhat cordate at the base, coarsely and doubly serrate, calyx-lobes and pedicels downy. Fruit broadly oval, downy over the seed, the wing smooth. Inner bark very fragrant when dried, and a popular domestic remedy.*

II. CELTIS, Tourn.

Trees or shrubs with entire or serrate, petioled leaves. Flowers greenish, axillary, on wood of the same season, the staminate in small clusters, the fertile single or 2–3 together.*

1. **C. occidentalis, L.** HACKBERRY. A large or medium-sized tree having much the appearance of an elm, bark dark and rough. Leaves ovate, taper-pointed at the apex, abruptly obtuse and inequilateral at the base, sharply serrate, often 3-nerved from the base, smooth above, usually somewhat downy below. Fruit a small, dark purple stone fruit. On rich soil.

2. **C. mississippiensis, Bosc.** SOUTHERN HACKBERRY. A tree usually smaller than the preceding, bark gray, often very warty. Leaves broadly lanceolate or ovate, long taper-pointed at the apex, obtuse or sometimes heart-shaped at the base, entire or with very few serratures, smooth on both sides, 3-nerved. Fruit a purplish-black, globose stone fruit.*

20. MORACEÆ. Mulberry Family.

Trees, shrubs, or herbs, usually with milky juice, alternate leaves, large deciduous stipules and small monœcious or diœcious flowers crowded in spikes, heads or racemes, or enclosed in a fleshy receptacle. Staminate flowers with a 3–4-lobed calyx, stamens 3–4, inserted on the base of the calyx, filaments usually inflexed in the bud, straightening at maturity. Pistillate flowers 3–5-sepalous ; ovary 1–2-celled, 1–2-ovuled ; styles 2, receptacle and perianth often fleshy at maturity.*

I. MORUS, Tourn.

Trees or shrubs with milky juice, rounded leaves, and monœcious flowers in axillary spikes. Staminate flowers with a 4-parted perianth, and 4 stamens inflexed in the bud. Pistillate flowers with a 4-parted perianth which becomes fleshy in the multiple fruit, the pulpy part of which consists of the thickened calyx, bracts and so on of many flowers ; ovary sessile, stigmas 2, linear, spreading ; the fleshy perianth enclosing the ovary at maturity.*

1. **M. rubra, L.** Red Mulberry. A small tree. Leaves cordate-ovate, often 3–5-lobed on vigorous shoots, taper-pointed at the apex, serrate, rough above, white, densely woolly beneath. Mature fruiting spikes oblong, drooping, dark red or purple, edible. On rich soil. Wood very durable, bearing exposure to the weather.

2. **M. alba, L.** White Mulberry. A small tree. Leaves ovate, heart-shaped, acute at the apex, rounded and often oblique at the base, serrate or sometimes lobed. Smooth and shining on both sides. Mature fruit light red or white. Introduced and common about old dwellings.*

II. MACLURA, Nutt.

A small tree with milky juice. Leaves alternate, petioled, spines axillary. Flowers diœcious. Staminate flowers in short axillary racemes ; calyx 4-parted ; stamens 4, inflexed in the bud. Pistillate flowers in axillary, peduncled, capitate clusters ; calyx 4-parted, ovary sessile, style long ; calyces becoming thickened and fleshy in fruit and aggregated into a large, dense, globular head.*

1. **M. aurantiaca, Nutt.** OSAGE ORANGE. A small tree with ridged, yellowish-brown bark. Leaves minutely downy when young, becoming smooth and shining with age, ovate or ovate-oblong, taper-pointed at the apex, obtuse or subcordate at the base, entire, petioled. Staminate racemes about 1 in. long. Pistillate flower clusters about 1 in. in diameter. Fruit yellowish, tubercled, 3–4 in. in diameter. In rich soil. Native in Texas and extensively planted for hedges. Wood very durable when exposed to the weather, and therefore used for fence posts. As the wood does not swell or shrink with changes in its moisture, it is highly valued for wheel hubs, etc.*

III. BROUSSONETIA, L'Her.

Small trees with milky juice. Leaves alternate, petioled; flowers dicœcious. Staminate in cylindrical spikes, with a 4-cleft calyx, 4 stamens, and a rudimentary ovary. Pistillate flowers in capitate clusters. Calyx 3–4-toothed. Ovary stalked, style 2-cleft, fruit in a globular head.*

1. **B. papyrifera, Vent.** PAPER MULBERRY. A round-topped tree with yellowish-brown bark. Leaves cordate, often irregularly 2–3-lobed, serrate, rough above, downy beneath, long-petioled. Staminate spikelets peduncled, 2–3 in. long. Pistillate heads stout, peduncled, about 1 in. in diameter. Introduced from Asia and very common S. about old dooryards.*

IV. CANNABIS, Tourn.

Coarse herbs with very tough, fibrous bark. Leaves usually opposite, palmately compound. Flowers small, dicœcious, greenish, the staminate ones in compound racemes or panicles, the pistillate ones in spikes. Calyx of the staminate flowers of 5 sepals, that of the pistillate flowers of 1 large sepal which covers the ovary and the akene.

1. **C. sativa, L.** COMMON HEMP. An erect plant, 4–8 ft. high. Leaves large, petioled, of 5–7 lanceolate, irregularly serrate or toothed leaflets. Cultivated from Europe, S. and W., for its fiber, and sometimes runs wild along roadsides in rich soil.

21. URTICACEÆ. NETTLE FAMILY.

Herbs with watery juice, stem and leaves often clothed with stinging hairs. Leaves undivided, stipulate. Flowers

small, greenish, imperfect, apetalous in axillary clusters. Calyx of the staminate flowers 4–5-parted or 4–5-sepalous; stamens as many as the sepals and opposite them, filaments inflexed in the bud and straightening at maturity, anthers 2-celled. Calyx of pistillate flowers 2–4-sepalous; ovary sessile, 1-celled, stigma simple or tufted. Fruit an akene commonly enclosed in the dry, persistent calyx.*

URTICA, Tourn.

Annual or perennial herbs. Leaves with stinging hairs, opposite, petioled, several-nerved, dentate, or incised, stipulate. Flowers monœcious or dicœcious. Calyx of the staminate flowers 4-parted; stamens 4, inserted around a rudimentary ovary. Pistillate flowers with 4 unequal sepals, the inner ones dilated in fruit; akenes smooth, compressed.*

1. **U. urens, L.** SMALL NETTLE. Annual; stem stout, 4-angled, hairy, 12–18 in. tall, with few stinging hairs; branches slender. Leaves elliptical or ovate, serrate or incised, 3–5-nerved, acute or obtuse at the ends, thin, hairy; petioles often as long as the blades; stipules short. Flower clusters axillary, in pairs, loose, mostly shorter than the petioles. On damp soil in waste places.*

22. LORANTHACEÆ. MISTLETOE FAMILY.

Parasitic shrubs or herbs, leaves opposite, leathery, without stipules. Flowers monœcious or dicœcious, clustered or solitary; perianth of both calyx and corolla, or of a calyx only, or sometimes wanting; calyx-tube adnate to the ovary, sepals 2–8. Stamens as many as the sepals, and opposite them; ovary 1-celled, ovule 1. Fruit a berry.*

PHORADENDRON, Nutt.

Evergreen, shrubby plants, parasitic on trees; branches greenish, jointed, and very brittle. Leaves leathery. Flowers dicœcious, in short jointed spikes. Staminate flowers globular, calyx 2–4-lobed, stamens sessile at the base of the lobes,

anthers transversely 2-celled. Pistillate flowers with the calyx-tube adnate to the ovary, stigma sessile, berry 1-seeded.*

1. **P. flavescens, Nutt.** AMERICAN MISTLETOE. Very round, bushy; branches very brittle at the joints, opposite or whorled, 6 in. to 2 ft. long. Leaves flat, leathery, or somewhat fleshy, nearly veinless, obovate, entire, with short petioles. Flowering spikes solitary or 2–3 together in the axils of the leaves. Berry roundish, white, glutinous. Parasitic on many deciduous trees.*

23. SANTALACEÆ. SANDALWOOD FAMILY.

Herbs, shrubs, or trees with entire leaves. Flowers usually small. Calyx 4–5-cleft, its tube adnate to the ovary. Corolla wanting. Stamens as many as the calyx-lobes and opposite them, inserted on the margin of a fleshy disk. Style 1. Ovary 1-celled, with 2–4 ovules borne at the top of a free central placenta. Fruit 1-seeded.

COMANDRA, Nutt.

Low, smooth perennials with herbaceous stems, rather woody below, often parasitic. Leaves alternate and nearly sessile. Flowers nearly white, in small umbel-like clusters, perfect. Calyx bell-shaped at first. Stamens borne on a 5-lobed disk which surrounds the pistil, anthers connected by a tuft of hairs to the calyx-lobes.

1. **C. umbellata, Nutt.** BASTARD TOAD-FLAX. Plant 8–10 in. high, with very leafy stems. Roots attached to the roots of trees, from which they draw nourishment. Leaves oblong or oblanceolate, pale, nearly 1 in. long. Umbel-like clusters about 3-flowered, longer than the leaves. Rocky, dry woods.

24. ARISTOLOCHIACEÆ. DUTCHMAN'S PIPE FAMILY.

Herbaceous plants, stemless or with twining and leafy stems. Leaves alternate, without stipules, petioled, mostly roundish or kidney-shaped. Flowers axillary, solitary or clustered, perfect, regular or irregular. Calyx tubular, 3 or

6 lobed, usually colored. Petals none. Stamens 6–12, inserted on the ovary. Pistils 1, ovary mostly 6-celled, many-seeded.*

I. ASARUM, Tourn.

Perennial, stemless, aromatic herbs, with slender, branching rootstocks. Leaves long-petioled, from kidney-shaped to halberd-shaped. Flowers axillary, peduncled. Calyx regular, 3-lobed, withering-persistent. Stamens 12, the filaments partially united with the style and usually prolonged beyond the anthers. Ovary 6-celled with parietal placentæ, many-seeded. Mature capsule roundish, often somewhat fleshy.*

1. **A. canadense, L.** WILD GINGER. Plant soft, hairy. Leaves 2, large, kidney-shaped, on long petioles, with the flower borne on a short peduncle between them. Flower greenish outside, brownish-purple inside. Calyx-tube wholly adnate to the ovary, calyx-lobes taper-pointed, widely spreading, reflexed at the tip. Rich, shady woods, common N.

2. **A. virginicum, L.** VIRGINIA ASARUM. Leaves evergreen, 1–3 to each plant, smooth, mottled, round-cordate, entire, 2–3 in. long and broad; petioles smooth or downy along one side, 3–7 in. long. Flowers nearly sessile, greenish without, dull purple within, $\frac{2}{3}$–$\frac{3}{4}$ in. long, tube inflated below, narrow at the throat, lobes spreading. Rich, shady woods.*

II. ARISTOLOCHIA, Tourn.

Erect or twining perennial herbs or woody vines. Leaves alternate, heart-shaped at the base, palmately nerved, petioled, entire. Flowers irregular, solitary, or in small clusters. Calyx more or less adnate to the ovary, tubular, irregular. Stamens mostly 6, sessile, adnate to the angled and fleshy 3–6-lobed or angled stigma. Capsule naked, 6-valved, seeds very numerous.*

1. **A. Sipho, L'Her.** DUTCHMAN'S PIPE, PIPE VINE. A tall climber. Leaves dark green, smooth, round-kidney-shaped, sometimes 1 ft. wide. Peduncles 1-flowered, with a single clasping bract. Calyx 1½ in. long, bent into the shape of a pipe, its border abruptly spreading, brownish-purple. Rich woods, often cultivated.

2. **A. tomentosa, Sims.** DUTCHMAN'S PIPE. Stem woody, climbing high, branches and leaves densely woolly. Leaves heart-shaped, prominently veined, 3–5 in. long and broad. Flowers axillary,

mostly solitary, on slender peduncles. Calyx bent in the shape of a pipe, yellowish-green with a dark purple throat, limb unequally 3-lobed, rugose, reflexed. Anthers in pairs below the 3 spreading lobes of the stigma. Capsule oblong. Stems sometimes 30 ft. long. Rich woods S.*

25. POLYGONACEÆ. Buckwheat Family.

Herbs with alternate, entire leaves and usually with sheathing stipules above the swollen joints of the stem. Flowers apetalous, generally perfect, with a 3–6-cleft calyx, generally colored and persistent. Fruit a compressed or 3-angled akene, enclosed in the calyx. Seeds with endosperm, which does not generally enclose the embryo. Stamens 4–12, on the base of the calyx.

I. RUMEX, L.

Coarse herbs, many of them troublesome weeds. Flowers small, usually green or greenish, generally in whorls borne in panicled racemes. Calyx of 6 nearly distinct sepals, the 3 inner larger and more petal-like than the 3 outer, and one or more of them usually with a little knob or tubercle on its back. Stamens 6. Styles 3. Stigmas short, fringed. Fruit a 3-angled akene, closely covered by the 3 inner calyx-lobes, enlarged and known as valves.

1. **R. Acetosella, L.** Sheep Sorrel. Erect annual or perennial herbs with creeping rootstocks. Stem simple or branched, smooth. Leaves petioled, narrowly halberd-shaped, usually widest above the middle, the apex acute or obtuse, upper stem-leaves often nearly linear and not lobed. Flowers dicœcious, small, in terminal, naked, panicled, interrupted racemes. Calyx greenish; the pistillate panicles becoming reddish. Fruit less than $\frac{1}{12}$ in. long, granular, longer than the calyx. A common introduced weed, in dry fields and on sour soils. Foliage very acid.*

2. **R. verticillatus, L.** Swamp Dock. Perennial, stem stout, smooth, erect or ascending, 3–5 ft. tall. Lower leaves oblong, obtuse at the apex and usually heart-shaped at the base, long-petioled, often 12–18 in. long, upper leaves narrower and often acute at both ends. Flowers perfect or somewhat monœcious, in dense whorls, pedicels slender, $\frac{1}{2}$–$\frac{2}{3}$ in. long, tapering downward,

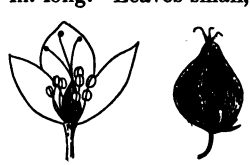
reflexed at maturity. Calyx green, the valves broadly triangular, abruptly pointed, reticulated, a distinct long and narrow tubercle on the back of each. Swamps and wet ground.*

3. **R. crispus, L.** YELLOW DOCK. Stout, smooth, 3–4 ft. high. Leaves lanceolate, margins very wavy, acute, the lower more or less heart-shaped. Root long, tapering gradually downward, yellow, very tough. Flowers in whorls crowded in long, straight, slender racemes. Valves roundish heart-shaped, mostly tubercled. A very hardy weed, introduced from Europe.

II. POLYGONUM, L.

Annual or perennial, terrestrial or aquatic herbs, with enlarged joints and simple, alternate, entire leaves; the sheathing stipules often cut or fringed. Flowers perfect, usually white or rose-colored, each flower or cluster subtended by a membranaceous bract, similar to the stipules of the leaves. Calyx mostly 5-parted, the divisions petal-like, erect and persistent. Stamens 3–9. Styles 2–3-parted. Fruit lens-shaped or 3-angled.*

1. **P. aviculare, L.** KNOT-GRASS. Annual or perennial. Stem prostrate or ascending, diffuse, smooth, 6–24 in. long. Leaves small, lanceolate or linear-oblong, obtuse, nearly or quite sessile. Stipules thin and dry, 2–3-cleft or cut. Flower-clusters axillary, 1–5-flowered, flowers inconspicuous, nearly sessile. Calyx greenish-white, 5-parted, the lobes with white or colored borders. Stamens 5–8. Style 3-parted; akene 3-angled, not shining. A common weed in dooryards and where the ground is trampled.*



A *B*

FIG. 10. — Buckwheat. *A*, flower, longitudinal section; *B*, fruit (both somewhat enlarged).

2. **P. Dumetorum, L.** FALSE BUCKWHEAT. Perennial; stems slender, twining, branched, 2–10 ft. long. Leaves ovate, taper-pointed, heart-shaped to halberd-shaped at the base, long-petioled. Stipules cylindrical, truncate. Flowers in axillary, more or less compound and leafy racemes. Calyx greenish-white, the outer lobes winged and forming a margin on the pedicel. Stamens 8. Stigmas 3; akene 3-angled, black, smooth, and shining. Margins of fields and thickets.*

26. CHENOPODIACEÆ. Goosefoot Family.

Herbs or shrubs. Leaves simple, alternate, without stipules. Flowers small, regular, either perfect or more or less monœcious or dicœcious. Calyx free from the ovary. Corolla wanting. Stamens usually 5, opposite the sepals. Styles or stigmas generally 2. Fruit with 1 seed, usually enclosed in a small, bladdery sac, sometimes an akene.

I. SPINACIA, Tourn.

Herbs. Flowers dicœcious, in close axillary clusters. Staminate flowers 3–5-sepaled, with 4 or 5 projecting stamens. Pistillate flowers with a tubular 2-toothed or 4-toothed calyx.

1. **S. oleracea, Mill.** Spinach. A soft annual or biennial herb. Leaves triangular, ovate, or halberd-shaped, petioled. Cultivated from Asia as a pot-herb.

II. CHENOPODIUM, Tourn.

Annual or perennial herbs. Stems erect or spreading. Leaves alternate, usually white-mealy. Flowers small, green-

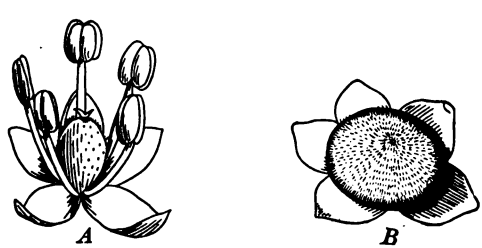


Fig. 11. — *Chenopodium.*

A, flower; *B*, fruit.

ish, in panicled spikes. Calyx 3–5-parted, the lobes often slightly fleshy and keeled. Stamens 5; filaments thread-shaped. Styles 2–3, distinct or united at the base. Seed lens-shaped.*

1. **C. hybridum, L.** MAPLE-LEAVED GOOSEFOOT. A tall annual herb 2–4 ft. high. Leaves 2–6 in. long, thin, bright green, long, taper-pointed, with several angled lobes on each side, terminating in pointed teeth. Flower-clusters rather large, consisting of loosely panicled racemes. A rather common weed.

2. **C. Botrys, L.** JERUSALEM OAK. A low spreading plant covered with sticky down. Leaves with slender petioles, oblong, sinuately lobed or the lobes pinnate. Flowers in loose, diverging, leafless racemes. The whole plant is sweet-scented. Introduced from Europe and naturalized in gardens and along roadsides.

27. PHYTOLACCACEÆ. POKEWEED FAMILY.

Plants with alternate entire leaves. Flowers perfect, 5-parted, with the characters of the Goosefoot Family, but the ovary generally consisting of several carpels, which unite to form a berry.

PHYTOLACCA, Tourn.

Perennial herbs. Stems tall, branching. Leaves large, entire. Flowers small, in terminal racemes, pedicels bracted. Calyx of 4–5 nearly equal, persistent sepals. Stamens 5–15, inserted at the base of the calyx. Styles 5–12, recurved at the apex. Fruit a depressed-globose, juicy berry.*

1. **P. decandra, L.** POKEWEED. Stems erect, smooth, branched above, usually dark purple, 4–7 ft. tall; root large, fleshy, poisonous. Leaves ovate-lanceolate, smooth, acute, long-petioled. Racemes peduncled, many-flowered, opposite the leaves, flowers white, becoming purplish. Stamens 10, shorter than the sepals. Styles 10, carpels 10; fruit a dark purple berry. A weed on waste ground. The young branches are often eaten like asparagus, and the root, known as "garget root," is used in medicine.*

28. AIZOACEÆ. ICE-PLANT FAMILY.

Mostly fleshy plants, mainly natives of Africa. Flowers often large and showy. Stamens often doubled and some of them petal-like. Ovary 2–many-celled.

[Our only very common genus belongs to a subfamily which has little resemblance to the fleshy "ice-plants," found in some gardens, which best represent the family as a whole.]

MOLLUGO, L.

Low branching annuals. Sepals 5, greenish outside, white inside. Corolla wanting. Stamens 5, alternate with the sepals, or 3, alternate with the cells of the ovary. Capsule 3-celled, many-seeded.

1. **M. verticillata, L.** CARPET-WEED. Stems branching and forming radiating patches. Leaves clustered in apparent whorls at the joints of the stem, spatulate. Flowers in little sessile umbels at the joints. Stamens commonly 3. A troublesome weed in sandy soil and common on sandy beaches and river banks.

29. PORTULACACEÆ. PURSLANE FAMILY.

Generally herbs. Leaves opposite or alternate, entire; stipules dry and membranaceous. Sepals 2. Petals 4 or more, distinct or united below. Stamens 4 or more, free or adnate to the petals. Ovary usually free, 1-celled; style simple or 3-cleft; ovules 2–many. Capsule opening transversely with a lid, or 2–3-valved.

I. CLAYTONIA, Gronov.

Perennial; stem simple, smooth, erect, 4–10 in. high. Leaves 2, opposite, smooth, succulent. Flowers in a terminal raceme. Sepals 2, ovate, persistent. Petals 5, sometimes coherent at the base. Stamens 5, inserted on the base of the petals. Style 3-cleft, ovary 1-celled, 3–6-seeded.

1. **C. virginica, L.** SPRING BEAUTY. Stem simple, erect from a deep, tuberous root. The 2 stem-leaves narrowly elliptical, 3–6 in. long, smooth, fleshy; basal leaves occasionally produced. Flowers on short pedicels. Petals white or pink, with darker veins, $\frac{1}{4}$–$\frac{3}{8}$ in. long, notched. Capsule shorter than the persistent sepals. Common in rich woods.*

2. **C. caroliniana, Michx.** NORTHERN SPRING BEAUTY. Flowers fewer, smaller, and whiter than No. 1, fragrant. Leaves 1–2 in. long, ovate-lanceolate or spatulate, pretty distinctly petioled. Moist woods, especially N.

II. PORTULACA, Tourn.

Annual; stems low, diffuse, and spreading, fleshy. Leaves entire, mostly alternate. Flowers terminal. Sepals 2, united at the base and coherent with the ovary. Petals usually 5, inserted on the calyx, quickly withering. Stamens 8–20, inserted on the calyx. Style 3–8-parted. Capsule globose, opening by the upper portion coming off like a lid, 1-celled, many-seeded.*

1. **P. oleracea, L.** PURSLANE. Stems prostrate, diffuse, fleshy. Leaves alternate, flat, obovate, or wedge-shaped. Flowers solitary, sessile, opening in bright sunshine in the morning, and usually withering before noon. Sepals broad, acute. Petals yellow. Stamens 10–12. Capsule very-many-seeded, seeds small, wrinkled. A common garden weed.*

2. **P. grandiflora, Hook.** GARDEN PORTULACA. Stems fleshy, erect, or ascending, densely hairy or nearly smooth, 3–6 in. long. Leaves alternate, cylindrical, fleshy, ½–1 in. long. Flowers 1–2 in. wide, white, yellow, or red, showy, opening only in sunlight. Common in cultivation and often growing spontaneously.*

30. CARYOPHYLLACEÆ. PINK FAMILY.

Herbs sometimes woody below, with thickened nodes. Leaves opposite, entire; stipules small and dry or none. Sepals 4–5. Petals 4–5 (rarely 0), usually hypogynous. Stamens usually 8–10, hypogynous or perigynous. Styles 2–5 (rarely 1). Ovules 1–many. Fruit usually a capsule.

A.

Sepals distinct or nearly so. Petals (if any) without claws. Capsule several–many-seeded.

Styles usually 3. Capsule ovoid. Stellaria, I.

Styles 5 or 4. Capsule cylindrical. Cerastium, II.

B.

Sepals united into an urn-shaped tube. Petals none. Fruit 1-seeded. Scleranthus, III.

C.

Sepals more or less united. Petals with claws. Capsule several–many-seeded.

(*a*) Calyx without bracts, its lobes long and leaf-like. Agrostemma, IV.

(*b*) Calyx without bracts, lobes not leaf-like. Styles 3 or 4. Silene, V.

(*c*) Calyx without bracts, lobes not leaf-like. Styles 5 (rarely 4). Lychnis, VI.

(*d*) Calyx with little bracts at the base. Styles 2. Dianthus, VII.

I. STELLARIA, L.

Slender, usually smooth herbs. Flowers small, white, solitary, or in forking cymes. Sepals 5 (rarely 4). Petals 5 (rarely 4), 2-cleft or divided. Stamens 10 (rarely 8, 5, or 3), maturing in 2 sets. Styles 3 (rarely 4 or 5), opposite the same number of petals; ovary 1-celled, many-ovuled. Capsule short, splitting into as many valves as there are styles.

1. **S. media, Cyrill.** COMMON CHICKWEED. Stem prostrate, 6–18 in. long, with a line or two of hairs along it. Leaves ovate, taper-pointed, the lower petioled, the upper sessile. Petals shorter than the sepals, sometimes wanting. An annual weed, introduced from Europe, common in damp, shady places N.

2. **S. longifolia, Muhl.** LONG-LEAVED STITCHWORT. Stem slender, usually erect, 8–18 in. high, often sharply 4-angled. Leaves linear or nearly so, spreading. Flower-clusters peduncled, many-flowered, the pedicels spreading. Petals 2-parted, at length longer than the calyx. Perennial in meadows and grassy thickets, especially N.

II. CERASTIUM, L.

Annual or perennial. Stems diffuse, usually downy ; leaves opposite. Flowers white, peduncled, in terminal, regularly forking cymes. Sepals 4–5. Petals 4–5, notched or 2-cleft. Stamens 10. Styles 5 or less. Capsule cylindrical, 1-celled, many-seeded.*

1. **C. vulgatum, L.** MOUSE-EAR CHICKWEED. Annual or sometimes perennial. Stems diffuse, tufted, clammy-downy, 6–12 in.

high. Lower leaves spatulate, the upper oblong, acute, or obtuse; bracts thin and dry. Flowers in loose cymes, pedicels becoming much longer than the calyx. Sepals lanceolate, acute, about as long as the 2-cleft petals. Slender capsule becoming twice as long as the calyx and curved upward. A common garden weed.*

III. SCLERANTHUS, L.

Low tufted herbs. Leaves opposite, clasping, awl-shaped, sharp-pointed. Flowers very small and greenish. Calyx-tube funnel-shaped or urn-shaped, hardening into an envelope for the fruit; calyx-lobes 4–5, short, erect. Petals none. Stamens 1, 2, 5, or 10, inserted on the throat of the calyx. Styles 2, thread-like. Fruit 1-seeded, never opening.

1. **S. annuus, L.** KNAWEL. A much-branched annual weed, 2–8 in. high. Stem and leaves pale green; the leaves ¼ to ½ in. long, rather prickly pointed. Flowers solitary in the lower axils and somewhat clustered above. Calyx-teeth with narrow whitish margins. Introduced from Europe, common in sandy roads and waste ground E.

IV. AGROSTEMMA, L.

Annual; stem pubescent, branching above. Leaves linear-lanceolate or linear, pubescent, sessile. Flowers showy, on long and naked peduncles in terminal corymbs. Calyx tubular, the tube oblong, 10-ribbed, lobes elongated, leaf-like, deciduous. Petals 5, shorter than the calyx lobes, entire. Stamens 10. Styles 5, capsules 1-celled.*

1. **A. Githago, L.** CORN COCKLE. Stem erect, rather slender, 1–3 ft. tall, gray, with long, appressed hairs. Leaves linear-lanceolate, acuminate, erect, 2–4 in. long. Petals obovate, notched, purple. Capsule 5-toothed, many-seeded; seeds black. An introduced weed, common in grain fields.*

V. SILENE, L.

Annual or perennial herbs. Stems erect or decumbent and diffuse. Leaves often connate or whorled. Flowers clustered or solitary, usually pink or white. Calyx tubular, more or less inflated, 5-toothed, 10-nerved, bractless. Petals 5, long-clawed, and with the ten stamens inserted at the base of the ovary. Styles 3, ovary 1-celled or 3-celled at the base, opening by 6 teeth, many-seeded. Seeds usually roughened.*

1. **S. Cucubalus, Wibel.** SNAPPERS, RATTLEBOX. A perennial branched herb about 1 ft. high. Leaves opposite, smooth, ovate, or ovate-lanceolate. Calyx thin and bladdery, beautifully veined. Petals white, 2-cleft. Capsule nearly globular. In fields and along roadsides, especially eastward. Introduced from Europe.

2. **S. pennsylvanica, Michx.** WILD PINK. A perennial with low clustered stems (4–8 in.). Root-leaves wedge-shaped or spatulate, those of the stem lanceolate. Flowers medium-sized, clustered. Petals wedge-shaped, notched, pink, with a crown at the throat of the corolla. Gravelly soil E.

3. **S. virginica, L.** FIRE PINK. A slender perennial with erect stem, 1–2 ft. high. Root-leaves spatulate, the upper leaves oblong-lanceolate. Flowers few, peduncled, large and showy, bright crimson. Corolla crowned, petals deeply 2-cleft. Woods.

4. **S. Armeria, L.** CATCHFLY, NONE-SO-PRETTY. A smooth, erect annual or biennial, 6–15 in. high. Several nodes of the stem are usually covered for part of their length with a sticky substance. Leaves very smooth, with a bloom beneath, lanceolate or oblong-lanceolate, clasping. Flowers showy, dark pink, nearly ½ in. in diameter, in flat-topped clusters. Calyx club-shaped. Petals somewhat notched. Cultivated from Europe and introduced.

5. **S. antirrhina, L.** SLEEPY CATCHFLY. Stem smooth, slender, 8–30 in. high, sticky in spots. Leaves lanceolate or linear. Flowers rather few and small, panicled. Calyx ovoid. Petals inversely heart-shaped, pink, opening only for a short time in sunshine. Dry waste ground.

6. **S. noctiflora, L.** NIGHT-FLOWERING CATCHFLY. A tall, coarse annual or biennial weed, covered with sticky hairs. Lower leaves spatulate, the upper ones lanceolate and pointed. Flowers large, white, opening at night or in c'oudy weather. Calyx-teeth very long and awl-shaped. Petals 2-parted. In fields and gardens, introduced from Europe.

VI. LYCHNIS, L.

Plants with nearly the same characteristics as Silene, but usually with 5 styles.

1. **L. chalcedonica, L.** SCARLET LYCHNIS, LONDON PRIDE. A tall, hairy perennial (about 2 ft.). Leaves lance-ovate, somewhat clasping. Flower-cluster flat-topped and very dense. Flowers bright scarlet, not very large. Petals 2-lobed. Common in old gardens; from Russia.

2. **L. coronaria, Lam.** MULLEIN PINK. A forking perennial plant, 2 ft. high, covered with white, cottony down. Root-leaves very wavy, spatulate; stem-leaves ovate-lanceolate, wavy, clasping.

Peduncles long, 1-flowered. Flowers about 1¼ in. broad, deep crimson. Calyx-tube very strongly 5-ribbed, with 5 smaller ones between; calyx-teeth short and slender. Petals somewhat notched. Cultivated in old gardens; from Italy.

VII. DIANTHUS, L.

Tufted, mostly perennial herbs, often shrubby at the base. Leaves narrow and grass-like. Flowers solitary or variously clustered. Calyx tubular, 5-toothed, with overlapping bracts at the base. Petals 5, with long claws. Stamens 10, maturing 5 at a time. Styles 2; ovary 1-celled. Capsule cylindrical, 4-valved at the top.

1. **D. Armeria, L.** DEPTFORD PINK. Rather erect, annual, with stiff stems 1–2 ft. high. Leaves very dark green, linear, 1–2 in. long, the lower obtuse, the upper acute. Flowers loosely clustered, small, dark pink. Calyx-tube ½–¾ in. long, nearly cylindrical. Petals narrow, speckled with very small whitish dots. In sandy fields eastward, introduced from Europe; sometimes cultivated.

2. **D. barbatus, L.** SWEET WILLIAM. Perennial, often in large clumps. Stems erect, branching above, smooth, 1–2 ft. tall. Leaves lanceolate, 2–3 in. long, acute. Flowers crimson-pink, white or variegated, in terminal clusters, bracts linear, as long as the calyx. Common about old gardens; from Europe.*

3. **D. plumarius, L.** COMMON PINK, GRASS PINK. Leaves grass-like, with a whitish bloom. Petals white, pink, or variegated, with the limb fringed. Flowers solitary, fragrant. Hardy perennials, cultivated from Europe.

4. **D. Caryophyllus, L.** CARNATION, CLOVE PINK. Much like the preceding species, but with larger fragrant flowers; the broad petals merely crenate. Hothouse perennials (some hardy varieties), cultivated from Europe.

31. NYMPHÆACEÆ. WATER-LILY FAMILY.

Perennial aquatic herbs. Leaves usually floating, often shield-shaped. Flowers borne on naked scapes. Floral envelopes and stamens all hypogynous or else adnate to a fleshy disk that encloses the carpels. Sepals 3–6. Petals 3–5 or often very numerous. Stamens many. Carpels 3 or more, free, in a single circle or united with the disk. Fruit a berry or a group of separate carpels.

I. NELUMBO, Tourn.

Rootstock large and stout. Leaves round, shield-shaped, often raised above the water. Flowers large, raised above water at first, but often submerged after blooming. Sepals and petals hypogynous, numerous, the inner sepals and outer petals not distinguishable from each other. Stamens many, hypogynous. Pistils several, 1-ovuled, borne in pits in the flattish upper surface of a top-shaped receptacle, which enlarges greatly in fruit.

1. **N. lutea, Pers.** AMERICAN LOTUS. WATER CHINQUAPIN. Rootstock often 3–4 in. in diameter, horizontal. Leaves 1½–2½ ft. broad, prominently ribbed, with much bloom above, often downy beneath. Petioles and peduncles stout. Flowers pale yellow, 5–9 in. broad. Sepals and petals falling quickly. Fruit top-shaped, 3–4 in. in diameter; the seeds ½ in. in diameter. In ponds and slow-running streams W., introduced from the Southwest.*

II. NYMPHÆA, Tourn.

Rootstock horizontal, creeping extensively. Leaves floating, entire, shield-shaped or heart-shaped. Flowers showy. Sepals 4, green without, white within. Petals many, white, becoming smaller towards the center. Stamens many, the outer with broad and the inner with linear filaments. Ovary many-celled, stigmas shield-shaped and radiating. Fruit berry-like, many-seeded.*

1. **N. odorata, Ait.** WHITE WATER-LILY. Rootstock large, branched but little. Leaves floating, entire, the notch narrow, and basal lobes acute, green and smooth above, purple and downy beneath. Petioles and peduncles slender. Flowers white, very fragrant, opening in the morning, 3–5 in. broad. Fruit globose, seeds enclosed in a membranaceous sac. In ponds and still water.*

III. NUPHAR, Smith.

Rootstock horizontal, thick, cylindrical. Leaves heart-shaped, floating or erect. Flowers yellow. Sepals 4–6, green on the outside, obovate, concave. Petals many, hypogynous, the inner ones becoming small and stamen-like. Stamens many, hypogynous. Ovary cylindrical, many-celled, stigma disk-shaped. Fruit ovoid.*

1. **N. advena.** YELLOW POND LILY, COW LILY, SPATTERDOCK. Leaves oval or orbicular, rather thick, often downy beneath. Flowers bright yellow, 2–3 in. in diameter, depressed-globular. Sepals 6. Petals thick and fleshy, truncate. Stamens in several rows, anthers nearly as long as the filaments. In slow streams and still water.*

32. RANUNCULACEÆ. BUTTERCUP FAMILY.

Herbs, rarely shrubs, usually with biting or bitter juice. Leaves radical or alternate (in Clematis opposite ; stem-leaves or involucre whorled in anemone) ; stipules none or adnate to the petiole. Floral organs all distinct and unconnected. Sepals 5 or more (rarely 2–4), falling early, often petal-like. Petals none, or 5 or more (rarely 3). Stamens many. Carpels many, 1-celled ; stigmas simple ; ovules 1 or more. Fruit composed of 1-seeded akenes or many-seeded follicles. Seeds small.

A.

Flowers irregular.

With a spur. — Delphinium, VII.

With a hood. — Aconitum, VIII.

B.

Flowers regular.

1. Petals present (in *c* not very unlike the stamens).
   - (*a*) Petals very large and showy. — Pæonia, I.
   - (*b*) Petals small, tubular at the tip. — Coptis, IV.
   - (*c*) Petals narrow, spatulate, on slender claws. — Actæa, V.
   - (*d*) Petals prolonged backward into spurs. — Aquilegia, VI.
   - (*e*) Petals flat, with a little scale at the base, inside. — Ranunculus, XIII.
2. Petals none, or very small and stamen-like.
   - (*a*) Sepals yellow. — Caltha, II.
   - (*b*) Sepals greenish or white, falling as the flower opens. — Thalictrum, XIV.
   - (*c*) Sepals white or colored, involucre sepal-like. — Hepatica, X.
   - (*d*) Sepals 4. Plants climbing. — Clematis, XII.

(*e*) Sepals 5, white. Flowers axillary and terminal. Pods 2–several-seeded. Isopyrum, III.

(*f*) Sepals white or colored. Plants not climbing. Akenes more or less tailed with the styles in fruit. Anemone, IX.

(*g*) Sepals 5–10, white. Flowers in an umbel. Roots tuberous. Anemonella, XI.

I. PÆONIA, L.

Perennial; from thick, fleshy roots; stems shrubby or herbaceous. Leaves much divided. Flowers terminal, large and showy. Sepals 5, leaf-like and persistent. Petals 5 or more. Pistils 3–5; ovaries surrounded by a disk.*

1. P. officinalis, L. GARDEN PÆONY. Herbaceous; flowering stems 1–2 ft. high. Leaves ample; leaflets lance-ovate, cut or incised, smooth. Flowers double, white or red. Follicles 2, erect, many-seeded. Common in gardens.*

II. CALTHA, L.

Smooth perennials with large, roundish leaves. Sepals petal-like, 5–9. Petals none. Pistils 5–10, each consisting of a 1-celled ovary with a nearly sessile stigma. Fruit a many-seeded follicle.

1. C. palustris. MARSH MARIGOLD, COWSLIPS, MEADOW BUTTERCUP (both the latter unsuitable names, but in common use). Stem hollow, smooth, ascending; leaves smooth, roundish and heart-shaped, or kidney-shaped, with crenate, dentate, or nearly entire margins; the broad oval sepals bright yellow. Swamps or wet ground.

III. ISOPYRUM, L.

Small, smooth herbs. Leaves 2–3 times compound, in threes; the leaflets 2–3-lobed. Flowers peduncled, white. Sepals 5, petal-like, soon falling. Petals wanting (in our species). Stamens 10–40. Pistils 3–6 or more.

1. I. biternatum, Torr. and Gr. A delicate, erect plant, with alternate branches, looking much like Anemonella, with clustered stems from perennial tuberous roots. Damp woods.

IV. COPTIS, Salisb.

Low, smooth perennials with 3-divided root-leaves. Flowers small, white, on scapes. Sepals 5–7, petal-like, soon falling. Petals 5–7, small, club-shaped, tubular at the apex. Stamens 15–25. Pistils 3–7, stalked. Pods thin and dry, 4–8-seeded.

1. **C. trifolia, Salisb.** GOLD THREAD. A pretty, delicate plant, with slender, 1-flowered scapes, from long, bright-yellow, thread-like rootstocks, which are bitter and somewhat medicinal. Leaves later than the flowers, each of 3 wedge-shaped leaflets, which finally become shining and evergreen. Damp, cold woods and bogs.

V. ACTÆA, L.

Perennial; stem simple. Leaves 2–3, compound in threes. Leaflets ovate, sharply cut or toothed. Flowers white, in a short and thick terminal raceme. Sepals 4–5, soon deciduous. Petals 4–10, small. Pistil single; stigma 2-lobed. Fruit a many-seeded berry.*

1. **A. alba, Bigel.** BANEBERRY. Stem erect, smooth or nearly so, 18–24 in. high. Leaves large and spreading; leaflets thin. Racemes very broad. Petals slender, truncate. Pedicels red, thickened in fruiting; berries white. In rich woods, more common S.*

2. **A. spicata, var. rubra, Ait.** RED BANEBERRY. Stem about 2 ft. high. Raceme ovoid or hemispherical. Petals acute. Pedicels slender. Berries usually red, sometimes white, ovoid. Common N.

VI. AQUILEGIA, Tourn.

Perennials with leaves twice or thrice palmately compound, the divisions in threes.

Sepals 5, petal-like, all similar. Petals 5, all similar, each consisting of an expanded portion, prolonged backward into a hollow spur, the whole much longer than the calyx. Pistils 5, forming many-seeded pods.

1. **A. canadensis, L.** WILD COLUMBINE. Flowers scarlet without, yellow within, nodding; spurs rather long.

2. **A. vulgaris, L.** GARDEN COLUMBINE. Flowers often double and white, blue, or purple. Spurs shorter and more hooked. Cultivated from Europe, and sometimes become wild.

VII. DELPHINIUM, Tourn.

Annual or perennial herbs ; stem erect, simple, or branched. Leaves alternate, petioled, palmately divided. Flowers in terminal racemes or panicles, showy. Sepals 5, colored, irregular, the upper one prolonged into a spur. Petals 4, unequal, the two upper ones with long spurs which are enclosed in the spur of the upper sepal, the other two short-stalked. Pistils 1–5 ; ovaries many-seeded.*

1. **D. tricorne, Michx.** DWARF LARKSPUR. Perennial. Stem simple, from a tuberous root, usually low (½ to 1 ft. high), but sometimes 2 ft. high. Leaves deeply 5-parted, the divisions irregularly 3–5-cleft. Racemes few-flowered, loose. Flowers blue, sometimes white. Pods diverging. Southward.

2. **D. azureum, Michx.** BLUE LARKSPUR. Perennial. Stem usually simple, slender, downy, 1–2 ft. high. Leaves 2–3 in. wide, 3–5-parted, the divisions cleft into 3–5 narrow, toothed, or entire lobes. Flowers in a strict, many-flowered, terminal raceme, showy, blue or whitish. Spur ascending, curved ; lower petals bearded, 2-cleft. Pods erect. On rich or rocky soil in open places. Northward.*

VIII. ACONITUM, L.

Erect, perennial herbs. Leaves alternate, palmately lobed or cut. Flowers irregular, in panicles or racemes. Sepals 5, the back one large, arched, and hooded, the front one the narrowest. Petals 2–5, small, the 2 back ones clawed and covered by the hood of the sepals ; 3 lateral ones small or wanting. Follicles 3–5. Seeds many, wrinkled.

1. **A. Napellus, L.** MONKSHOOD. An erect, poisonous plant, 1–2 ft. high. Raceme simple and densely flowered. Flowers dark blue. Cultivated from Europe.

IX. ANEMONE, Tourn.

Perennial herbs, usually with radical leaves, and 2 or 3 opposite or whorled stem-leaves, constituting an involucre some distance below the flower or flower-cluster. Sepals few or numerous, colored and petal-like. Petals usually wanting. Akenes pointed, or with long, feathery tails.

1. **A. patens, var. nuttalliana, Gray.** PASQUE FLOWER. Low plants, 1 in. to 1 ft. high, clothed with long, silky hairs. Leaves

divided in threes. Flower single, large, showy, pale-purplish, borne on a peduncle developed before the leaves. Carpels many, with long, hairy styles, which in fruit form tails 2 in. long. Prairies and bluffs, N. W.

2. **A. caroliniana, Walt.** CAROLINA ANEMONE. Stem simple, from a roundish tuber, slightly downy, 6–12 in. high, bearing a single flower about 1 in. broad. Root-leaves 2–3, long-petioled, compound in threes, the divisions cut or lobed; stem-leaves sessile, compound in threes, the divisions wedge-shaped. Sepals 12–20, white; head of fruit becoming oblong; akenes woolly. In open woods W.*

3. **A. cylindrica.** LONG-FRUITED ANEMONE. Plants about 2 ft. high, branching, with an involucre of long-petioled, divided and cleft leaves, from within which spring several long, naked peduncles. Flowers greenish-white. Sepals obtuse. Head of fruit cylindrical. composed of very many densely woolly akenes. Dry woods and prairies.

4. **A. virginiana, L.** Plant hairy, 2–3 ft. high. Peduncles 6–12 in. long, sometimes forking, the first ones naked, the later ones with a little 2-leaved involucre at the middle. Leaves of the involucre 3, each 3-parted, the divisions ovate-lanceolate, pointed. Sepals acute. Head of fruit ovoid. Woods and meadows.

5. **A. quinquefolia, L.** WIND-FLOWER, WOOD ANEMONE. Stem simple, from a thread-like rootstock; involucre of 3 leaves, each petioled, and of 3 leaflets, which are cut, toothed, or parted. Peduncle 1-flowered. Sepals 4–7, white, often tinged with purple outside. Carpels 15 or 20. This species is very nearly related to, but now regarded as distinct from, the European *A. nemorosa*.

X. HEPATICA, Dill.

Involucre of 3 small, simple leaves, so close to the flower as to look like a calyx. Leaves all radical, 3-lobed, heart-shaped, thick, and evergreen, purplish-red beneath. Flowers single, on rather slender hairy scapes.

1. **H. triloba, Chaix.** ROUND-LOBED HEPATICA. Lobes of the leaves obtuse or rounded; those of the involucre obtuse; sepals 6-12, varying from blue to white.

2. **H. acutiloba, DC.** SHARP-LOBED HEPATICA. Closely similar to the former, except for the acute lobes of the leaves and tips of the involucre.

[Both species have many local names, such as Liverleaf, Liverwort, Noble Liverwort, Spring Beauty.]

XI. ANEMONELLA, Spach.

Small, perennial herbs. Leaves compound, smooth, those from the root long-petioled, those of the stem sessile. Flowers in a terminal umbel, slender-pediceled. Sepals petal-like. Petals none. Pistils 4–15; stigmas sessile, truncate.*

1. **A. thalictroides, Spach.** RUE ANEMONE. Stem slender, 6–10 in. high, from a cluster of tuberous roots. Radical leaves long-petioled, twice compound in threes, leaflets oval, heart-shaped, 3–5-lobed. Stem-leaves 2–3 compound in threes whorled, the long-stalked leaflets veiny, forming an involucre of 6–9 apparently simple leaves. Flowers 3–6 in an umbel, ½–¾ in. wide; sepals 6–10, white. In rich woods.*

XII. CLEMATIS, L.

Perennial herbs or slightly woody vines, usually climbing by the leaf-stalks. Leaves opposite, simple, or compound. Sepals 4, petal-like. Petals very small or wanting. Pistils numerous, tipped by the persistent styles which often become long and plumose in fruit.*

1. **C. crispa, L.** MARSH CLEMATIS. Stem climbing, a little woody below, slightly downy above, 3–5 ft. high. Leaves pinnately compound; leaflets 5–7, varying from lanceolate to ovate, thin, entire, or 3–5-lobed. Flowers showy, perfect, solitary, on long, axillary peduncles. Sepals lanceolate, taper-pointed, thick, wavy on the margins, twice the length of the stamens, light bluish-purple, 1–1½ in. in length. Tails of the ripened akenes 1 in. long, silky. Rich woods and river banks S.*

2. **C. viorna, L.** LEATHER FLOWER. Stem climbing, nearly smooth, 6–10 ft. long. Leaves usually pinnately compound, the lowest pair often compound in threes and the upper pair simple. Leaflets usually 5–7, oblong-ovate or oval, acute, firm, entire, or lobed. Calyx bell-shaped, nodding; sepals ovate, taper-pointed with a short, recurved point, thick and leathery, reddish-purple, 1 in. long. Tails of the akenes plumose, 1½ in. long, brownish. On river banks and rich soil.*

XIII. RANUNCULUS, Tourn.

Annual or perennial herbs. Leaves alternate, usually deeply lobed or parted. Flowers axillary or in corymbs, white or yellow. Sepals 3–5. Petals 3–5, flat, with a small

pit or scale inside at the narrowed base. Stamens usually numerous. Pistils few or several in a head. Akenes flattened, pointed.*

1. **R. pusillus, Poir.** Low Spearwort. Perennial. Stems several, erect or ascending, branched, smooth, 6–15 in. high. Leaves entire or slightly toothed, the lower round or cordate, long-petioled, the upper lanceolate or elliptical, nearly or quite sessile. Flowers very small, about $\frac{1}{8}$ in. wide, yellow. Petals 1–5, as long as the sepals. Stamens 3–10. Akenes smooth, with a very short point. On muddy banks.*

2. **R. abortivus, L.** Small-flowered Crowfoot. Perennial. Stems smooth, branching, 12–18 in. high. Root-leaves round-cordate, crenate, petioled. Stem-leaves 3–5-parted, with wedge-shaped or linear divisions, sessile. Flowers very small, pale yellow. Sepals reflexed, longer than the petals. Akenes in a globose head, smooth, without a beak. Common on wet ground and waste places.*

3. **R. recurvatus, Poir.** Hooked Crowfoot. Perennial. Stem erect, hairy, 1–2 ft. high. Leaves all nearly alike, petioled, 3–5-lobed with the lobes wedge-shaped, cut or toothed at the apex. Flowers small, pale yellow. Petals minute, shorter than the reflexed sepals. Akenes in a globular head, smooth, with a slender, recurved beak. On low ground.*

4. **R. pennsylvanicus, L.** Bristly Crowfoot. Perennial. Stems rough-hairy, erect, 2–3 ft. high. Leaves compound in threes, on long and very hairy petioles; leaflets long-stalked, 3-parted, the divisions sharply lobed or toothed. Flowers small. Petals yellow, shorter than the sepals. Akenes flat, smooth, in oblong heads, beak broad and straight. On low ground.*

5. **R. bulbosus, L.** Bulbous Buttercup, Early Buttercup. Stem upright, from a solid bulb about as large as a filbert, about 1 ft. high, hairy. Root-leaves 3-divided, the divisions lobed and cleft. Peduncles furrowed. Flowers large and showy ($\frac{1}{2}$ to 1 in. in diameter). Sepals strongly reflexed. Petals roundish, wedge-shaped at the base. Akenes with a very short beak. Introduced from Europe. Common in grass fields in New England.

6. **R. acris, L.** Tall Buttercup. Erect, hairy, 2–3 ft. high. Leaves 3–7-parted, the divisions of the lower ones wedge-shaped, deeply cut and lobed. Peduncles not furrowed. Sepals spreading, downy. Petals obovate, a little smaller and paler yellow than in No. 5. A common weed, introduced from Europe, in grass fields and elsewhere, especially eastward.

XIV. THALICTRUM, L.

Erect perennial herbs. Leaves compound, with stipules. Flowers in panicles or racemes, often somewhat monœcious or diœcious, wind-fertilized. Sepals 4–5, petal-like. Petals none. Stamens many. Carpels few or many ; ovule 1. Fruit a small head of akenes. [The following species are both usually diœcious.]

1. **T. dioicum, L.** Early Meadow Rue. Plant 1–2 ft. high, smooth and pale or with a bloom. Leaves all petioled, most of them thrice compound in threes ; leaflets thin and delicate, roundish, 3–7-lobed. Flowers in slender panicles, purplish or greenish ; staminate ones with slender, thread-like filaments, from which hang the conspicuous yellowish anthers. Rocky woods and hillsides.

2. **T. polygamum, Muhl.** Tall Meadow Rue. Stems from fibrous roots, tall and coarse, nearly or quite smooth, 4–8 ft. tall. Leaves twice compound, those of the stem sessile, the others long-petioled ; leaflets oval or oblong, often cordate, smooth or downy beneath, quite variable in size on the same plant. Flowers small, in large panicles. Sepals 4 or 5, white. Filaments club-shaped. Akenes short-stalked. Thickets and meadows E.

33. BERBERIDACEÆ. Barberry Family.

Herbs or shrubs. Leaves alternate, simple or compound, usually without stipules. Sepals petal-like. Petals hypogynous, distinct, their number some multiple of 2, 3, or 4, never of 5. Stamens one opposite each petal, anthers opening by 2 uplifted lids. Pistil 1, 1-celled, ovules 2 or more. Fruit a berry or capsule.

I. BERBERIS, L.

Spiny shrubs with yellow wood. Leaves spinous-toothed, jointed on the very short petiole, often reduced to 3–7-cleft spines. Flowers in racemes, solitary, or in pairs. Sepals 8–9, the outer minute. Petals 6, each with 2 nectar glands at the base. Stamens 6. Ovules few. Berry 1–2-seeded ; seeds bony-coated.

1. **B. vulgaris, L.** Common Barberry. A shrub 4–6 ft. high. Leaves obovate, spinous-serrate ; those on the old shoots mere

spines. Flowers pale yellow, in drooping racemes. Stamens irritable, closing quickly toward the center of the flower when touched. Berry ½ in. long, nearly ellipsoidal in shape, scarlet or orange-scarlet, very acid, eatable when cooked. Cultivated from Europe and introduced in eastern New England and locally in the upper Mississippi valley.

2. **B. Thunbergii, DC.** A low shrub. Leaves entire, turning red and remaining so for a considerable time in autumn. Flowers solitary or in pairs. Berries bright red, remaining on the branches all winter. Cultivated from Japan.

II. CAULOPHYLLUM, Michx.

A perennial smooth herb, 1–2½ ft. high. Leaf large, single, sessile, thrice compound in threes, borne high up on the stem; there is also a large, very compound radical leaf. Flowers racemed or panicled, yellowish-green. Sepals 6, with 3 bractlets. Petals 6, gland-like, somewhat curved inward at the tip, much smaller than the sepals. Pistil 2-ovuled, the ovary soon bursting open and leaving the 2 blue seeds to ripen naked.

1. **C. thalictroides, Michx.** Blue Cohosh, Pappoose Root. Whole plant purplish and covered with a bloom when young. Flowers appearing before the leaf is fully developed. Rich woods.

III. PODOPHYLLUM, L.

Perennial. Stem simple, smooth, erect, 12–15 in. tall, bearing 2 leaves with a large white flower between them. Sepals 6, falling off as the flower opens. Petals 6–9, obovate. Stamens twice as many as the petals. Pistil 1, stigma large, flat, sessile. Fruit berry-like, 1-celled, many-seeded.*

1. **P. peltatum, L.** May-apple. Rootstock rather large. Leaves orbicular, shield-shaped, 5–9-lobed and toothed, smooth, 9–12 in. wide. Flowers 1–2 in. wide, on a peduncle 1–2 in. long. Stamens prominent, anthers opening longitudinally. Fruit 1½–2 in. long, oval, fragrant, edible; each seed surrounded by a pulpy covering. In rich woods. The roots and leaves are used in medicine.*

34. MAGNOLIACEÆ. Magnolia Family.

Trees or shrubs. Leaves alternate, not toothed or serrate. Flowers solitary, large, and showy. Floral envelopes and

stamens hypogynous. Calyx and corolla colored alike, the parts of the perianth forming 3 or more circles of 3 parts each. Stamens many. Carpels many, usually cohering over the long receptacle and forming a sort of cone-shaped fruit, which may be either fleshy or dry.

I. MAGNOLIA, L.

Aromatic trees or shrubs; leaves alternate, often in clusters at the ends of the branches, entire, usually thick and leathery; stipules large, quickly deciduous; flowers terminal, showy, perfect; sepals 3, caducous; petals 6–12, in 2–4 rows, concave; stamens numerous; ovaries numerous, 1-celled, 2-seeded, the mature follicles opening at the beak, and the fleshy seeds remaining for some time suspended by slender threads.*

1. **M. grandiflora, L.** LARGE-FLOWERED MAGNOLIA. A large tree with spreading branches and a rounded top; bark nearly smooth. Leaves very thick, evergreen, smooth and shining above, rusty-downy beneath, entire, oval or oblong, 6–9 in. long. Flowers white, very fragrant, 6–9 in. in diameter. Petals 9 or more, obovate, concave. Fruit a rusty-downy cone 3–4 in. long, seeds bright scarlet. Common on light soils in Arkansas and the Gulf States.*

2. **M. Fraseri, Walt.** LONG-LEAVED UMBRELLA TREE. A small tree with a slender trunk and widely spreading branches. Leaves clustered at the ends of the branches, deciduous, oblong or obovate, contracted, cordate and eared at the base, smooth on both sides, 8–12 in. long; petioles slender. Flowers white and fragrant, 6 in. broad. Petals longer than the sepals, spatulate or oblong, obtuse at the apex, narrowed at the base. Cone 3–4 in. long, pink at maturity. In rich woods S.*

3. **M. macrophylla, Michx.** LARGE-LEAVED UMBRELLA TREE. A small tree with gray bark. Leaves clustered at the ends of the branches, oblong or obovate, obtuse at the apex, cordate at the base, green and glabrous above, white and downy beneath, 1½–3 ft. long; petioles stout. Flowers white with a purple center, fragrant, 8–12 in. wide; petals oblong, obtuse, two or three times as long as the sepals. Cone ovate, 4–6 in. long, bright red at maturity. Shady woods on light soil S.*

4. **M. virginiana, L.** SWEET BAY. A small tree with light gray bark. Leaves scattered on the branches, evergreen, thick and leathery, oval or oblong, smooth and green above, white and with

a bloom, downy beneath, 4–6 in. long. Flowers white, fragrant, 2–3 in. in diameter; petals 9, concave. Cone 1½–2 in. long, pink. Common in swamps and along streams, New York and southward (a few in eastern Massachusetts). The leaves often used in flavoring soups, etc.

II. LIRIODENDRON, L.

A large tree with rough, dark-colored bark. Leaves scattered on the branches, deciduous, 3-lobed, truncate, stipuled, petioled. Flowers perfect. Sepals 3, reflexed. Petals 6, erect. Stamens numerous. Ovaries numerous, 2-ovuled, cohering over each other on the elongated receptacle, never opening, deciduous.*

1. **L. tulipifera, L.** TULIP TREE. The largest tree in the family. Leaves roundish in outline, mostly 3-lobed, the terminal lobe truncate or broadly notched, usually heart-shaped at the base, smooth, green above, lighter beneath. Petioles slender. Flowers terminal, bell-shaped, greenish-yellow marked with orange. Petals obovate, obtuse, about as long as the sepals. Mature cones ovate, acute, 2–3 in. long. Common on low ground, Pennsylvania and S. Often called "white wood" or, incorrectly, "white poplar." Wood valuable for making boxes and light furniture.*

35. CALYCANTHACEÆ. CALYCANTHUS FAMILY.

Shrubs. Leaves opposite, entire, without stipules. Flowers solitary, often sweet-scented. Sepals and petals numerous, the outer sepals bract-like. Stamens many, short, the inner ones usually sterile. Ovaries several, inserted on the inside of an irregular, hollow, pear-shaped receptacle something like a large rose-hip, forming 1-seeded akenes in fruit.

CALYCANTHUS, L.

Shrubs, 4–8 ft. tall; branches opposite. Leaves oval, downy beneath, short-petioled; both leaves and bark aromatic. Sepals and petals many, in several rows, somewhat fleshy, indistinguishable. Pistils several, inserted on the inner side of the persistent calyx-tube. Mature fruit pear-shaped, dry, enclosing the akenes.*

1. **C. floridus, L.** SWEET-SCENTED SHRUB, STRAWBERRY BUSH, SPICE BUSH, SHRUB. A widespreading bush, 4–8 ft. high; twigs downy. Leaves oval or oblong, acute or taper-pointed, rough above, downy beneath, 2–3 in. long. Flowers 1 in. wide, brownish-purple, very fragrant; sepals united below to form a cup, on the inside of which the other parts of the flower are inserted, cup leafy-bracted on the outside. Banks of streams and rich hillsides S., often cultivated.*

36. ANONACEÆ. PAWPAW FAMILY.

Trees or shrubs. Leaves alternate, entire; pinnately veined. Flowers perfect, hypogynous, axillary, solitary. Calyx of 3 sepals, corolla of 6 thickish petals in 2 rows. Stamens many, filaments very short. Pistils several or many, becoming fleshy or pulpy in fruit.

ASIMINA, Adans.

Shrubs or small trees. Leaves deciduous. Flowers nodding. Sepals 3, ovate. Petals 6, the 3 outer ones larger and spreading. Stamens very numerous, crowded on the globular receptacle. Ovaries 3–15, sessile, 1-celled, several-ovuled. Fruit a large, fleshy, oblong berry, seeds large, horizontal.*

1. **A. triloba, Dunal.** PAWPAW. A small tree, 10–20 ft. high; bark nearly smooth, lead-colored. Leaves oblong-obovate, acute at the apex, obtuse at the base, rusty-downy when young and becoming smoother with age, 6–10 in. long. Flowers on branches of the previous season, appearing before or with the leaves; the short peduncles and the sepals brown-downy. Petals purple, obovate, 3–4 times longer than the sepals. Fruit 3–5 in. long, edible when ripe. Common on banks of streams, especially S. and S. W. The bark is very tough and is often used in the place of rope.*

37. LAURACEÆ. LAUREL FAMILY.

Aromatic plants, nearly always trees or shrubs. Leaves alternate, simple, usually entire, and marked with translucent dots. Calyx regular, hypogynous, of 4 or 6 colored sepals.

Stamens in 3 or 4 circles of 3 each, the anthers opening by valves. Style single. Fruit a 1-seeded berry or stone-fruit.

I. SASSAFRAS, Nees.

A tree with rough, yellowish bark and a spreading top. Leaves deciduous, entire or 2–3-lobed. Flowers dicœcious, involucrate, at the end of the twigs of the previous season. Calyx 6-parted, persistent in the pistillate flowers. Stamens 9, in 3 rows. Pistillate flowers with 4–6 abortive stamens and a single ovary. Fruit a stone-fruit.*

1. S. officinale, Nees. SASSAFRAS. A tree, usually small and slender, but sometimes with a trunk 3 ft. in diameter and 125 ft. high. Leaves oval, entire, mitten-shaped or 3-lobed, downy when young but becoming smooth with age, dark green above, paler below, petiolate. Racemes several in a cluster, peduncled; flowers yellow. Stamens about as long as the sepals. Fruit dark blue, ovoid, on thickened, red pedicels. All parts of the tree aromatic; trees producing pistillate flowers rare. Common. The wood is valuable for cabinet-making, and an aromatic oil is extracted from the bark.*

II. LINDERA, Thunb.

Shrubs; leaves deciduous, entire. Flowers in lateral, sessile clusters, appearing before the leaves, dicœcious or somewhat monœcious. Involucre of 4 scales. Stamens 9 in the staminate flowers, filaments slender. Pistillate flowers with 12–15 abortive stamens and a single globose ovary with a short style.*

1. L. Benzoin, Blume. SPICE BUSH. A shrub, 5–15 ft. high, with smooth bark and slender twigs. Leaves oblong-obovate, acute at the base, pale and downy beneath, becoming smooth when old; petioles short. Flowers about as long as the pedicels, yellow, very fragrant. Ovary about as long as the style. Fruit an obovoid, red stone-fruit about $\frac{1}{3}$ in. long, on a slender pedicel. Banks of streams and damp woods. Twigs and leaves quite aromatic.*

38. PAPAVERACEÆ. POPPY FAMILY.

Annual or perennial herbs, often with milky juice. Leaves sometimes all radical, stem-leaves usually alternate without

stipules. Flowers perfect, regular or irregular. Sepals usually 2, shed as the flower opens. Petals 4–12, falling early. Stamens numerous or 6 (in 2 sets), 4, or 2. Carpels 2–16. Fruit a capsule.

I. ESCHSHOLTZIA, Cham.

Annual or perennial herbs. Leaves pale or bluish-green, usually cut into very narrow divisions. Sepals united into a pointed cap, which falls off in one piece as the flower opens. Petals 4, orange or yellow. Stamens many, with long anthers. Stigmas 2–6, spreading. Pods long and slender, grooved. Receptacle often surrounded by a rim on which the calyx rests.

1. **E. californica, Cham.** Annual or perennial, with rather succulent leafy stems. Flowers large and showy, yellow or orange-yellow. Receptacle top-shaped, with a broad rim. Cultivated from California.

II. SANGUINARIA, Dill.

Perennial. Rootstock thick, horizontal, joints and scars of previous growths persistent several years; juice orange-colored. Leaves on long petioles, kidney-shaped. Scape 1-flowered. Sepals 2, falling off as the flower opens. Petals 8–12. Ovary 1, stigmas 2; capsule oblong, seeds crested.*

1. **S. canadensis, L.** BLOODROOT. Leaves and scape with a bloom; leaves palmately 5–9-lobed, lobes rounded or toothed; scapes naked, nearly as long as the petioles. Flowers white, 1 in. or more wide. Petals oblong or obovate, quickly deciduous. Capsule 1-celled, 2-valved, the valves separating from the persistent placentæ at maturity. In rich, open woods.*

III. CHELIDONIUM, L.

Erect, branched, perennial herbs with yellow juice. Leaves much divided. Flowers yellow. Sepals 2, falling as the flower opens. Petals 4. Ovary 1-celled; style dilated at the top, with 2 adnate stigmas. Capsule linear.

1. **C. majus, L.** CELANDINE. Stem 1–2 ft. high, brittle, slightly hairy, leafy. Leaves once or twice pinnate. Flowers small. A rather common weed in yards and along fences. Introduced from Europe.

IV. PAPAVER, Tourn.

Annual or perennial herbs with milky juice. Stem erect, smooth, or rough-hairy, branching above. Leaves more or less lobed or dissected. Flower-buds nodding, flowers showy. Sepals commonly 2, falling off as the flower opens. Petals 4–6. Stamens many. Stigma disk-like, ovules many, borne on many inwardly projecting placentæ.*

1. **P. somniferum, L.** OPIUM POPPY. Annual; stem erect, branched above, smooth and with a bloom, 2–3 ft. high. Leaves oblong, irregularly lobed or cut, sessile, clasping. Flowers nearly white, with a purple center, large and showy, on long peduncles. Capsule globose, seeds minutely pitted. About old gardens and waste places. Cultivated in southern Asia, where the juice of the capsules is dried to make opium.*

2. **P. dubium, L.** CORN POPPY. Annual; stem slender, branching, 1–2 ft. tall. Leaves pinnatifid, the lower petioled, the upper sessile. Flowers large and showy, usually red; capsule long-obovoid, smooth. In cultivated ground. Both the species named are often cultivated in gardens and produce double flowers.*

3. **P. orientale, L.** ORIENTAL POPPY. A large, rough-hairy perennial. Leaves large, deep green, almost pinnate. Flower very large, deep red. Cultivated from the eastern Mediterranean region.

4. **P. nudicaule, L.** ICELAND POPPY. A delicate but rough-hairy perennial plant. Leaves all radical, pale, pinnately cut. Flowers yellow-orange or white, borne singly on rather slender, hairy scapes. Cultivated from Europe.

V. DICENTRA, Borkh.

Smooth, delicate herbs with watery juice. Leaves compound in threes and finely cut. Flowers racemed, nodding. Sepals 2, small and scale-like. Petals 4, slightly united to form a heart-shaped or 2-spurred corolla (Fig. 12), the inner pair spoon-shaped, enclosing the stamens and pistil. Stamens ∞; the filaments somewhat united into 2 sets, and the anthers in 2 sets close to the stigma. Stigma 2-crested. Pod 10–20-seeded.

1. **D. Cucullaria, DC.** DUTCHMAN'S BREECHES, BREECHES FLOWER. A low, stemless perennial, with a delicate scape and a cluster of root-leaves with linear divisions from a sort of bulb made

of small, scaly grains. Flowers in a 4–10-flowered simple raceme, not fragrant. Spurs of the corolla longer than the pedicels; corolla mostly white with a yellowish tip. Rich woods, common.

2. **D. canadensis, DC.** SQUIRREL CORN, WILD HYACINTH. A low, stemless perennial, with scape and leaves much as in No. 1, and with small yellow tubers looking like grains of corn scattered along the underground shoots. Corolla only heart-shaped at the base, whitish or flesh-colored, very fragrant. Rich woods.

3. **D. spectabilis, DC.** BLEEDING HEART, EAR DROPS. Stems branching, recurved. Leaves large, twice compound in threes, the divisions rather broad, like those of the common peony. Racemes long, drooping, many-flowered. Flowers large, heart-shaped, bright pink. Cultivated from China.

VI. ADLUMIA, Raf.

A delicate climbing biennial. Leaves thrice-pinnate, cut-lobed. Sepals 2, very small. Petals 4, all united into a corolla which is slightly heart-shaped or 2-knobbed at the base, remaining as a spongy covering over the small, few-seeded pod.

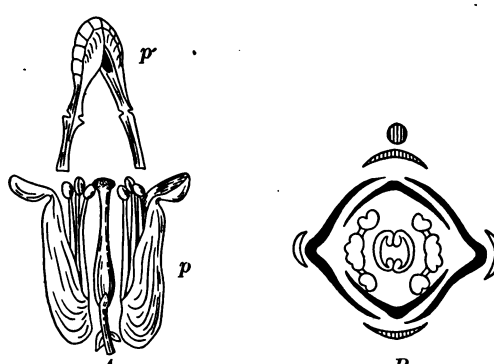


FIG. 12. — Flower of Dicentra.

A, view of flower partly dissected; *p*, the larger outer petals; *p'*, the spoon-shaped inner petals; *B*, floral diagram.

1. **A. cirrhosa, Raf.** MOUNTAIN FRINGE, ALLEGHANY VINE. Climbing several feet high by the leaf-stalks. Flowers pinkish-white. Rocky hillsides, often cultivated.

VII. CORYDALIS, Vent.

Leafy-stemmed biennial herbs (the American species). Leaves much divided, alternate or nearly opposite. Racemes terminal or opposite the leaves. Sepals 2, small. Petals 4; corolla with a single spur at the base, on the upper side. Capsule many-seeded.

1. **C. glauca, Pursh.** PALE CORYDALIS. Plant erect, covered with a bloom. Flowers pink-purple with yellow tips. Spur of the corolla very short and rounded. Rocky woods.

2. **C. aurea, Willd.** GOLDEN CORYDALIS. A low, spreading plant, finally ascending. Corolla bright yellow, 1–2 in. long; the spur shorter than the pedicel, somewhat bent. Shaded, rocky banks.

39. CRUCIFERÆ. MUSTARD FAMILY.

Herbs with pungent, watery juice and alternate leaves without stipules. Sepals 4, often falling off early. Petals usually 4, arranged in the form of a cross. Stamens 6, the 2 outer ones shorter than the 4 inner ones. Fruit generally a pod, divided into two cells by a thin partition which stretches across from one to the other of the two placentæ. The flowers throughout the family are so much alike that the genera and species cannot usually be determined without examining the tolerably mature fruit.

A.

Pods short and flattened, contrary to the partition, splitting open when ripe.

Pod roundish.	Lepidium, I.
Pod triangular, inversely heart-shaped.	Capsella, IX.

B.

Pods globular or cylindrical, splitting open when ripe.

(*a*) Pods globular. Flowers white. Petals much longer than the calyx. Cochlearia, II.

(*b*) Pods cylindrical; seeds ellipsoid. Flowers very small, yellow. Sisymbrium, III.

(*c*) Pods cylindrical; seeds globular. Flowers of moderate size, yellow. Brassica, IV.

(*d*) Pods cylindrical. Flowers white. Or pods ovoid or ellipsoid. Flower yellowish. Aquatic plants, or growing in wet soil. Nasturtium, VI.

C.

Pods elongated, often jointed, tapering toward the tip, never splitting open. Raphanus, V.

D.

Pods flattened parallel to the partition, splitting open when ripe.

(*a*) Wild species leafy-stemmed; growing in or near water. Pods linear. Cardamine, VII.

(*b*) Wild species; stems naked below, bearing only 2 or 3 leaves. Pods lanceolate. Dentaria, VIII.

(*c*) Wild species; leafy-stemmed; growing on dry ground or rocks. Pods linear; seeds usually winged or margined. Arabis, X.

(*d*) Cultivated species. Pods round or roundish. Lobularia, XI.

(*e*) Cultivated species, covered with a grayish down of star-shaped hairs. Pods cylindrical. Matthiola, XII.

I. LEPIDIUM, Tourn.

Annual; stem erect, or sometimes diffuse. Leaves entire, toothed, or pinnately divided. Flowers in a terminal raceme, small, white. Petals short, sometimes wanting. Stamens 2, 4, or 6. Pod rounded or obcordate, flattened contrary to the partition.*

1. **L. virginicum, L.** PEPPERGRASS, BIRDS' PEPPER, TONGUE-GRASS. Stem erect, smooth, much branched, 1–2 ft. high. Lower leaves obovate in outline, pinnately cut with dentate lobes; upper leaves lanceolate, dentate, slightly downy. Flowers on slender pedicels, petals present, sometimes reduced in the later flowers. Stamens 2. Pod round. A weed growing in waste places.*

II. COCHLEARIA, Tourn.

Perennial herbs. Leaves entire or pinnate. Flowers small, white. Sepals short. Petals with short claws. Pods globular or ellipsoid.

1. **C. Armoracia, L.** HORSE-RADISH. A coarse herb with large leaves from stout, long, cylindrical rootstocks filled with a very sharp, biting juice. Root-leaves long-petioled, linear-oblong, obtuse, regularly scalloped; stem-leaves sessile. Racemes in panicles. Pods obovoid, on long, slender pedicels. Seeds seldom or never ripening. Probably from Europe; cultivated and often introduced in damp ground.

III. SISYMBRIUM, Tourn.

Annual or biennial herbs. Radical leaves spreading; stem-leaves alternate, often eared at the base. Flowers in loose racemes, usually yellow, often bracted. Pods generally narrowly linear, cylindrical or 4–6-angled. Seeds many, ellipsoid, not margined.

1. **S. canescens, Nutt.** TANSY MUSTARD. Stem 1–2 ft. high. Leaves twice pinnately cut, usually covered with grayish down. Flowers very small, yellowish. Pods oblong, club-shaped, 4-angled, borne on pedicels projecting almost horizontally from the stem, in long racemes. Common westward.

2. **S. officinale, Scop.** HEDGE MUSTARD. Stems branching, stiff. Leaves runcinate-toothed or lobed. Flowers very small, pale yellow. Pods somewhat 6-sided, awl-shaped, closely pressed against the stem. An unsightly weed in waste ground, introduced from Europe.

IV. BRASSICA, Tourn.

Branching herbs. Leaves often pinnately cut. Flowers in racemes, rather large, yellow. Sepals spreading. Pods nearly cylindrical, sometimes tipped with a beak which does not open. Seeds globular.

1. **B. arvensis, Boiss.** CHARLOCK. Stem 1–2 ft. high; it and the leaves rough-hairy. Upper leaves rhombic-toothed or no. Flowers $\frac{1}{2}$–$\frac{3}{4}$ in. across, somewhat corymbed, bright yellow. Pods knotty, spreading, at least $\frac{1}{3}$ of each consisting of a 2-edged, 1-seeded beak. A showy, troublesome weed in grain fields, introduced from Europe.

2. **B. juncea, Coss.** Similar to the preceding, but nearly or quite smooth. Pedicels slender. Beak of the cylindric pod slender, conical, not containing a seed. Recently introduced from Asia and becoming very abundant eastward.

3. **B. alba, Boiss.** WHITE MUSTARD. Stem 2–5 ft. high, with reflexed hairs. Upper leaves pinnately cut. Pods borne on spreading pedicels, bristly, with a sword-shaped, 1-seeded beak occupying more than half their length. Seeds pale. Cultivated from Europe and introduced to some extent.

4. **B. nigra, Koch.** BLACK MUSTARD. Stem 3–6 ft. high, somewhat hairy. Lower leaves lyrate with the terminal lobe much the longest, stem-leaves linear-lanceolate, entire or toothed, smooth. Pods awl-shaped, 4-angled, smooth, lying against the stem. Seeds brownish, more biting than in No. 2. Cultivated from Europe and introduced.

V. RAPHANUS, Tourn.

Annual or biennial herbs. Root-leaves lyrate. Flowers in long racemes, white or yellow, purple-veined. Sepals erect. Pods rather long, slender-beaked, not splitting open but sometimes breaking across into 1-seeded joints.

1. **R. Raphanistrum, L.** WILD RADISH, JOINTED CHARLOCK. A stout, hairy annual 1–2 ft. high. Leaves cut into remote segments, which are coarsely toothed or serrate; terminal segment largest. Flowers yellow, turning whitish or purplish. Pods necklace-shaped, with a long beak. A common weed eastward, introduced from Europe.

VI. NASTURTIUM, R. Br.

Annual or biennial, mostly aquatic plants. Stems erect or diffuse, often widely branching. Leaves simple, pinnately lobed. Flowers small, white or yellow. Sepals spreading. Stamens 1–6. Pod short and broad or nearly linear. Seeds numerous in 2 rows in each cell.*

1. **N. officinale, R. Br.** WATERCRESS. Aquatic herbs. Stems smooth, diffuse, rooting at the joints. Leaves with 3–9 rounded, pinnate lobes, the terminal lobe much the largest. Racemes elongating in fruit. Petals white, twice the length of the sepals. Pods linear, $\frac{1}{2}$–$\frac{3}{4}$ in. long, on slender, spreading pedicels. In ditches and slow streams. Often used for salad.*

2. **N. palustre, DC.** YELLOW WATERCRESS. Annual or biennial. Stem erect, branched, slightly downy. Leaves irregularly

lyrate, the lower petioled, the upper sessile. Flowers small. Petals yellow. Pods linear, spreading, longer than the pedicels. In wet places.*

VII. CARDAMINE, Tourn.

Annual or perennial. Rootstock often scaly or bulb-bearing. Stem erect or ascending, usually smooth. Leaves more or less divided. Flowers in terminal racemes, white or purple. Petals rather large. Stamens 6. Fruit a linear flattened pod. Seeds several, in a single row in each cell.*

1. **C. rhomboidea, DC.** BULBOUS CRESS. Perennial. Root tuberous. Stem simple, erect, smooth, without runners, 9–18 in. tall. Lower leaves long-petioled, ovate, orbicular or heart-shaped, often angled or toothed, the upper short-petioled or sessile, lanceolate or oblong, toothed or entire. Pedicels ½–1 in. long. Petals white, ¼–⅓ in. long. Pod erect, linear-lanceolate, tipped by the persistent style. Seeds round-oval. Cool, wet places.*

2. **C. pennsylvanica, Muhl.** BITTER CRESS. Annual. Stem slender, erect, simple, or with a few slender branches, 6–15 in. tall. Leaves mostly in a cluster at the base of the stem, pinnately divided, the terminal lobe roundish, the lateral lobes narrower, somewhat hairy above, stem-leaves nearly linear. Flowers small. Petals white, longer than the sepals. Stamens 4. Pods linear, erect on erect pedicels, about 1 in. long. Seeds oval. In wet places.*

VIII. DENTARIA, Tourn.

Stems naked below, 2–3-leaved above, from a thickish, more or less knotted or interrupted rootstock. Flowers rather large, in early spring. Pod lance-linear, flattish. Seeds in 1 row, wingless, seedstalks broad and flat.

1. **D. diphylla, L.** TWO-LEAVED TOOTHWORT, PEPPER ROOT, CRINKLE ROOT. Rootstock long, often branched, toothed, eatable, with a flavor like that of cress or radish. Stem-leaves 2, close together, each composed of 3 ovate-diamond-shaped and toothed or crenate leaflets; the root-leaf like the stem-leaves. Flowers white. Damp woods.

2. **D. laciniata, Muhl.** CROW'S FOOT. Rootstock short, necklace-like. Stem-leaves 3-parted; root-leaf often absent. Flowers white or rose-color. Woods.

IX. CAPSELLA, Medic.

Annual. Stem erect, downy, with branched hairs. Racemes terminal, becoming elongated in fruit. Flowers small, white. Pod obcordate or triangular, flattened contrary to the partition, shorter than the spreading pedicel.*

1. **C. Bursa-pastoris, Moench.** SHEPHERD'S PURSE. Root long and straight. Stem branching above, downy below, smooth above. Lower leaves forming a rosette at the base of the stem, irregularly lobed or pinnately cut, stem-leaves lanceolate, clasping, toothed or entire. Sepals downy, about ½ as long as the petals. Pod triangular, notched, or cordate at the apex. Seeds several in each cell. A common weed.*

X. ARABIS, L.

Annual or perennial herbs, smooth or with forked or star-shaped hairs. Radical leaves spatulate; stem-leaves sessile. Flowers usually white. Petals entire, usually with claws. Pods linear, flattened. Seeds often margined or winged.

1. **A. hirsuta, Scop.** A rough-hairy, erect, leafy-stemmed biennial, 1–2 ft. high. Leaves simple; stem-leaves oblong or lanceolate, entire or toothed, somewhat clasping, often with an arrow-shaped base. Flowers small, greenish-white, the petals somewhat longer than the sepals. Pods and pedicels upright. Style almost wanting. Seeds roundish, somewhat wing-margined. Rocks, N.

2. **A. lævigata, Poir.** A smooth, leafy-stemmed biennial 1–2 ft. high, covered with a bloom. Stem-leaves lance-linear, clasping. Flowers small and whitish, the petals hardly longer than the sepals. Pods 2–3 in. long, flattened, spreading, and recurved. Seeds broadly winged. Rocks.

3. **A. canadensis, L.** SICKLE POD. An upright, leafy-stemmed biennial, 2–3 ft. high, simple or slightly branching above, sometimes slightly hairy at the base. Stem-leaves sessile, oblong-lanceolate, pointed at both ends, downy, the lower ones toothed. Flowers small, whitish, the petals twice as long as the sepals. Pods scythe-shaped, much flattened, hanging from hairy pedicels. Seeds broadly winged. Rocky hillsides.

XI. LOBULARIA, Desv. (ALYSSUM, L.)

Perennial, though usually growing as an annual. Stems branching, diffuse; branches slender. Leaves small, entire,

downy, with forked hairs. Flowers small, white, in numerous terminal racemes. Petals obovate, entire, twice as long as the sepals. Filaments enlarged below. Pod round, compressed. Seeds 1 in each cell.*

1. **L. maritima, Desv.** SWEET ALYSSUM. Stem weak, diffuse, ascending, minutely downy. Lower leaves narrowed into a petiole, the upper sessile. Racemes erect, many-flowered. Flowers fragrant, pedicels ascending. Pod often pointed. Common in cultivation and often run wild.*

XII. MATTHIOLA, R. Br.

Herbaceous or shrubby oriental plants, covered with a down composed of star-shaped hairs. Flowers in showy racemes of many colors, ranging from white to crimson. Stigmas large and spreading. Pods nearly cylindrical, except for a prominent midrib on each valve.

1. **M. incana, Br.** COMMON STOCK, GILLYFLOWER. Biennial or perennial, with somewhat woody stems. Cultivated in greenhouses and gardens.

40. CAPPARIDACEÆ. CAPER FAMILY.

Herbs (when growing in cool temperate regions), with bitter or nauseous juice. Leaves alternate, usually palmately compound. Flowers often irregular, usually perfect. Sepals 4–8. Petals 4 or wanting. Stamens 6 or more. Ovary and pod 1-celled, with 2 rows of ovules. Seeds kidney-shaped.

I. POLANISIA, Raf.

Ill-smelling annual plants covered with glandular or clammy hairs. Sepals distinct, spreading. Petals with claws, notched at the tip. Stamens 8–32, of various lengths. Receptacle not lengthened. Pod linear or oblong, rather large, many-seeded.

1. **P. graveolens, Raf.** A very strong-scented, leafy, branching herb, 6–15 in. high. Leaves with 3 oblong leaflets. Flowers small, pinkish and yellowish-white, in the axils of leafy bracts, in terminal racemes. Stamens 8–12, not much longer than the petals. Pod about 2 in. long, slightly stalked. Gravelly banks.

II. CLEOME, L.

Mostly annual herbs; stems branched. Leaves petioled, simple, or with 3–7 entire or serrate leaflets. Flowers in bracted racemes. Sepals 4, often persistent. Petals 4, often long-clawed, nearly equal, entire. Stamens 6, filaments thread-like, usually projecting much, but sometimes 1–3 much shorter than the others, inserted on the short receptacle. Ovary on a short stalk with a small gland at its base. Fruit a slender capsule on an elongated stalk.*

1. **C. integrifolia, Torr. and Gr.** ROCKY MOUNTAIN BEE PLANT. A smooth plant 2 ft. or more high. Leaves with 3 leaflets. Flowers pink, showy, in leafy-bracted racemes. Pod oblong to linear, 1–2 in. long. Cultivated as an ornamental plant and also for bees. Common in a wild condition W.

41. RESEDACEÆ. MIGNONETTE FAMILY.

Annual or perennial herbs, rarely shrubs. Leaves alternate, simple or pinnately cut. Flowers racemed or spiked, bracted. Calyx 4–7, parted, often irregular. Petals 4–7, hypogynous, often unequal and cleft or notched. Stamens usually many, borne on a large one-sided hypogynous disk. Ovary of 2–6 carpels, which are more or less united into a single 1-celled, many-seeded, several-lobed, or horned pistil, which opens at the top before the seeds ripen.

RESEDA, Tourn.

Annual; stems diffuse, widely branched. Leaves sessile, entire or lobed, smooth. Flowers in close racemes or spikes. Petals 4–7, toothed or cleft. Stamens 8–30, inserted at one side of the flower. Capsule 3–6-lobed.*

1. **R. odorata, L.** MIGNONETTE. Stem widely diffuse, 6–12 in. high, smooth. Leaves wedge-shaped, entire or 3-lobed. Flowers small, greenish-yellow, very fragrant. Petals deeply 7–13-cleft. Often cultivated. From Egypt.*

42. SARRACENIACEÆ. Pitcher-plant Family.

Perennial, stemless, marsh herbs. Leaves tubular or trumpet-shaped. Flowers single, nodding, on a naked or bracted scape. Sepals 4–5, colored, persistent. Petals 5, deciduous, or sometimes wanting. Stamens numerous. Pistil compound, 5-celled, many-ovuled; style terminal, nearly as broad as the flower, shield-shaped.*

SARRACENIA, Tourn.

Rootstock short, horizontal; scape naked. Leaves trumpet-shaped, with a wing extending nearly to the base and a broad blade at the apex (see Part II, Ch. XXVI); tube hairy within, with downward-pointing, stiff hairs. Calyx 3-bracted. Petals obovate, drooping or incurved. Style umbrella-shaped, 5-angled; stigmas at the hooked angles of the style on the under surface. Capsule globose, rough. [The tubular leaves usually contain more or less water and dead insects, the latter having been attracted by a honey-like secretion near the opening. For a full account of the structure and peculiar action of the leaves, see Goodale's *Physiological Botany*, pp. 347–353.]*

1. **S. purpurea, L.** Side-saddle Flower. Leaves ascending, curved, broadly winged, purple-veined, 4–8 in. long; blade erect, round-cordate, hairy on the inner side. Scapes 12–18 in. tall; flower deep purple, about 2 in. broad. Style yellowish. Mossy swamps.*

43. SAXIFRAGACEÆ. Saxifrage Family.

Herbs or shrubs. Leaves alternate or opposite, generally without stipules. Sepals 4 or 5, more or less coherent with each other and adnate to the ovary. Petals as many as the sepals and alternate with them. Stamens as many as the petals and alternate with them, or 2–10 times as many. Ovary usually of 2 carpels, united only at the base or more or less throughout. Fruit generally a 1–2-celled capsule, sometimes a berry. Seeds many, with endosperm.

I. SAXIFRAGA, L.

Herbs with simple or palmately cut leaves and generally cymose or panicled flowers. Sepals 5, more or less united. Petals 5, entire, inserted on the calyx-tube. Stamens 10. Capsule consisting of 2 (sometimes more) ovaries, united at the base, separate and diverging above.

1. **S. virginiensis, Michx.** EARLY SAXIFRAGE, MAYFLOWER. Perennial. Stemless, with a cluster of spatulate, obovate, or wedge-shaped root-leaves and a scape 3–9 in. high, which bears a dense cluster of small white flowers, becoming at length a panicled cyme. Petals white, oblong, much longer than the calyx. Rocks and dry hillsides N.

2. **S. pennsylvanica, L.** SWAMP SAXIFRAGE. Perennial. Leaves 4–8 in. long, oblong-lanceolate and tapering to the base, slightly toothed. Scape 1–2 ft. high, bearing an oblong cluster of small greenish flowers, at length diffusely panicled. Petals greenish-yellow (rarely crimson), linear-lanceolate, hardly longer than the calyx-lobes. Boggy ground.

II. TIARELLA, L.

Perennial. Flowers white, in racemes. Calyx white, 5-parted, nearly free from the ovary. Corolla of 5 very narrow petals, with slender claws, alternating with the calyx-lobes. Stamens 10, springing from the calyx-tube and extending outside the flower. Styles 2, long and slender. Ovary 1-celled, 2-beaked. In fruit one of the carpels grows to be much larger than the other, thus making up the main bulk of the thin, dry pod, which has a few seeds attached near the bottom.

1. **T. cordifolia, L.** FALSE MITRE-WORT. Stem 5–12 in. high, usually leafless, sometimes with 1 or 2 leaves. Rootstock bearing runners in summer. Leaves heart-shaped, sharply lobed, the lobes with acute or mucronate teeth, somewhat hairy above, downy beneath. Raceme short and simple. Rocky woods, especially N.

III. MITELLA, Tourn.

Delicate perennial herbs. Flowers small, pretty, in a simple raceme or spike. Calyx 5-cleft, adnate to the base of the

ovary. Petals 5, cut-fringed, inserted on the throat of the calyx-tube. Stamens 5 or 10, not projecting from the calyx-tube. Styles 2, very short. Ovary and pod 2-beaked, globular, 1-celled.

1. **M. diphylla, L.** TWO-LEAVED BISHOP'S CAP, FRINGE CUP, FAIRY CUP. Stemless, with long-petioled, roundish-cordate root-leaves, and a scape about 1 ft. high, bearing 2 opposite, nearly sessile leaves. Flowers many, racemed, white. Woods.

IV. HEUCHERA, L.

Perennials with a tall scape and roundish, heart-shaped radical leaves. Flowers rather small, greenish or purplish, in a long panicle. Calyx 5-cleft, the tube below adnate to the ovary. Petals 5, small, spatulate, inserted with the 5 stamens on the margin of the calyx-tube. Capsule 1-celled, 2-beaked, splitting open between the beaks.

1. **H. americana, L.** COMMON ALUM ROOT. Scapes 2–4 ft. high, rather slender, often several from the same root, hairy and glandular. Radical leaves large and long-petioled, abundant, somewhat 7-lobed. Flowers whitish with a tinge of purple, in a loose panicle. Stamens projecting considerably outside the flower, their anthers of a bright terra cotta color. The root is very astringent and is somewhat used as a home remedy. Shaded banks, fence rows, and thickets; common W.

V. PHILADELPHUS, L.

Shrubs. Leaves simple, opposite, 3–5-ribbed, petioled, without stipules. Flowers solitary or in cymes, large, white. Calyx-tube top-shaped, adnate to the ovary, the limb 4–5-parted, persistent. Petals 4–5, rounded or obovate. Stamens 20–40, shorter than the petals. Ovary 3–5-celled, many-seeded; styles 3–5, more or less united.*

1. **P. grandiflorus, Willd.** LARGE-FLOWERED SYRINGA. Shrub, 6–10 ft. high; branches downy. Leaves ovate or ovate-oblong, taper-pointed, sharply serrate, downy, 3-ribbed. Flowers solitary or 2–3 together, white, 1½–2 in. broad, not fragrant. Calyx-lobes ovate, taper-pointed, about twice as long as the tube. On low ground, S., and cultivated.*

2. **P. coronarius, L.** GARDEN SYRINGA. Shrub, 8–10 ft. high. Leaves oval or ovate, obtuse at the base, acute at the apex, remotely

toothed, smooth above, downy beneath. Flowers in terminal racemes, creamy white, 1–1½ in. wide, very fragrant. Calyx-lobes ovate, acute, longer than the tube. Common in cultivation.*

VI. DEUTZIA, Thunb.

Shrubs with simple, opposite leaves, without stipules. Flowers all perfect and alike, racemed or panicled, showy. Calyx-lobes 5. Petals 5. Stamens 10, 5 long and 5 short; filaments flat and 3-pronged, the middle prong bearing an anther. Styles 3–5, slender. Pod 3–5-celled.

1. **D. gracilis, Sieb. and Zucc.** About 2 ft. high, loosely spreading. Leaves ovate-lanceolate, sharply serrate, smooth. Flowers white, very numerous. Cultivated from Japan, often in greenhouses.

VII. RIBES, L.

Shrubs. Leaves palmately veined and lobed, sometimes with stipules. Calyx-tube egg-shaped, adnate to the 1-celled ovary, its 5 lobes usually colored like the petals. Petals 5, small, generally inserted on the throat of the calyx-tube. Stamens 5, inserted with the petals. Styles 2. Ovary 1-celled, with 2 placentæ on its walls, becoming in fruit a pulpy (usually eatable) berry.

1. **R. rotundifolium, Michx.** SMOOTH WILD GOOSEBERRY. Spines few and short, prickles few or absent. Leaves roundish, lobed, with the lobes crenate-dentate, often downy. Peduncles slender; flowers inconspicuous. Calyx-lobes reflexed. Styles and stamens projecting decidedly from the calyx-tube. Berries smooth.

2. **R. Cynosbati, L.** PRICKLY WILD GOOSEBERRY. Spines in pairs. Leaves long-petioled, downy, heart-shaped, cut-dentate. The single style and the stamens not projecting from the calyx-tube. Berries generally prickly, brownish-purple, pleasant-flavored.

3. **R. rubrum, L.** RED CURRANT. Stems more or less reclining. Leaves somewhat heart-shaped, obtusely 3–5-lobed. Racemes drooping. Limb of the calyx wheel-shaped. Berries acid, eatable, red or light amber-colored. Cultivated from Europe, also a variety wild in the northern United States.

4. **R. aureum, Pursh.** GOLDEN CURRANT, FLOWERING C., MISSOURI C., CLOVE C. A much taller shrub than the common red currant. Leaves 3-lobed, toothed. Racemes short and loose. Tube

of the yellow calyx much longer than its limb. Flowers very fragrant. Fruit brownish-black, barely eatable.

44. PLATANACEÆ. Sycamore Family.

Trees; with simple, alternate, petioled leaves with stipules, the bases of the petioles covering the buds. Flowers monœcious, in axillary, long-peduncled, globose heads. Calyx and corolla very inconspicuous, each consisting of 3–8 minute scales, or wanting. Stamens as many as the sepals and opposite them. Pistils several, inversely conical, hairy at the base, styles long. Capsules 1-seeded.*

PLATANUS, L.

Characters of the family.

1. **P. occidentalis, L.** Sycamore, Buttonwood. A large tree, bark light-colored, smooth, peeling off in large, thin plates. Leaves large, round heart-shaped, angularly lobed and toothed, densely white-woolly when young, becoming smooth with age; stipules large, toothed. Fruit in a globular, drooping head, which remains on the tree through the winter, dropping the seeds very slowly. Common on river banks and in swampy woods.*

45. ROSACEÆ. Rose Family.

Herbs, shrubs, or trees. Leaves alternate or rarely opposite, simple or compound, with stipules. Calyx 5-lobed. Petals 5, rarely wanting, inserted with the stamens on the edge of a disk that lines the calyx-tube. Stamens many, rarely 1 or few. Carpels 1 or more, distinct or coherent, free or adnate to the calyx-tube. Fruit a pome, a stone-fruit or group of stone-fruits, or 1–several akenes or follicles, rarely a berry or capsule. The relation of the parts of the flower to each other and to the receptacle is shown in Fig. 13.

A.

Ripe carpels not enclosed within the calyx-tube.

1. Fruit dry.
   (*a*) Carpels 1–5, inflated. Physocarpus, I.
   (*b*) Pods 5–8, not inflated. Spiræa, II.
   (*c*) Akenes 2–6, styles not lengthening after flowering. Waldsteinia, VIII.
   (*d*) Akenes many, on a dry receptacle. Styles not lengthening. Potentilla, X.
   (*e*) Akenes many, on a dry receptacle. Styles lengthening after flowering, forming tails to the akenes. Geum., XI.
2. Fruit fleshy.
   (*a*) Akenes several–many, becoming little stone-fruits. Rubus, VII.
   (*b*) Akenes many, dry on ripening, on a fleshy, eatable receptacle. Fragaria, IX.
   (*c*) Pistil solitary, becoming a stone-fruit. Prunus, XIII.

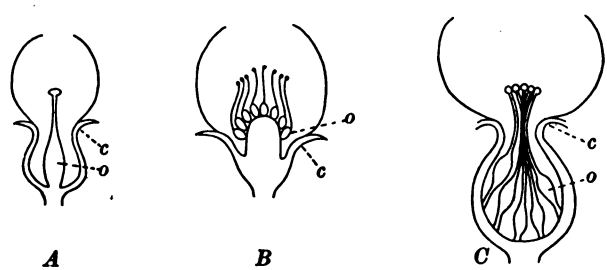


FIG. 13. — Pistils in the Rose Family.
A, Prunus-type; *B*, Potentilla-type; *C*, Rosa-type, *c*, calyx, *o*, ovary.

B.

Ripe carpels enclosed within the calyx-tube.

1. Fruit a pome.
   (*a*) Carpels more than 2-seeded; seeds covered with a mucilaginous pulp. Fruit 5-celled. Cydonia, III.

(*b*) Carpels 2-seeded (except in some cultivated varieties); seeds without pulp. Fruit 5-celled. Pyrus, IV.

(*c*) Carpels 2-seeded; fruit 10-celled. Amelanchier, V.

2. Fruit not evidently a pome or not at all so.

(*a*) Trees or shrubs. Fruit with a stone usually of 2–5 bony 1-seeded carpels united. Cratægus, VI.

(*b*) Herbs. Fruit consisting of numerous very small akenes collected on a fleshy, eatable receptacle. Fragaria, IX.

(*c*) Shrubs. Fruit with many akenes borne on the interior of a fleshy calyx tube. Rosa, XII.

(*d*) Trees or shrubs. Fruit a simple stone-fruit (plum or cherry). Prunus, XIII.

I. PHYSOCARPUS, Maxim.

Shrubs. Leaves simple, palmately veined and lobed, petioled. Flowers white, in terminal corymbs. Calyx spreading, 5-lobed. Petals 5. Stamens numerous. Pistils 1–5, short-stalked, stigma terminal; ovaries becoming inflated at maturity, 2–4-seeded, splitting open.*

1. **P. opulifolius, Maxim.** NINEBARK. A spreading shrub 3–6 ft. high, the old bark separating into thin strips. Leaves petioled, broadly ovate or rounded, often heart-shaped, 3-lobed, the lobes doubly crenate-serrate; stipules deciduous. Corymbs terminal, peduncled, nearly globose, downy, many-flowered. Follicles 3–5, much longer than the calyx, smooth and shining, obliquely tipped by the persistent style. Banks of streams.*

II. SPIREA, L.

Shrubs with simple leaves. Flowers perfect, in terminal or axillary racemes or panicles. Calyx 5-cleft, persistent. Petals 5. Stamens numerous. Pistils usually 5, free from the calyx and alternate with its lobes. Follicles not inflated, 2–several-seeded.*

1. **S. salicifolia, L.** WILLOW-LEAFED SPIREA. Shrubs 2–5 ft. high, branches smooth; leaves lanceolate to oblong-ovate, smooth or nearly so, sharply serrate, base usually wedge-shaped, pale beneath; stipules deciduous; flowers white or pink, panicle dense-flowered; follicles smooth. On low ground.*

2. **S. reevesiana, Gard.** BRIDAL WREATH. Shrubs 2–4 ft. tall; branches long, slender, and spreading; leaves lanceolate, serrate, sometimes 3-lobed or pinnatifid, with a bloom beneath; flowers white or pinkish, in axillary racemes or corymbs, often forming long wreaths; follicles smooth. Cultivated from Europe.

3. **S. tomentosa, L.** HARDHACK. Erect shrubs; stems densely downy, usually simple; leaves simple, ovate or oblong, serrate, densely rusty downy below, smooth and dark green above; flowers small, pink or purple, in a close panicle; follicles 5, densely downy, several-seeded. On low ground S., and along fence-rows and in pastures N., where it is a troublesome weed.*

III. CYDONIA, Tourn.

Trees or shrubs. Leaves simple, toothed or lobed, stipules deciduous. Flowers usually solitary, white or pink. Calyx-tube urn-shaped, adnate to the ovary, 5-lobed, lobes acute, spreading, persistent. Petals 5. Stamens numerous, inserted with the petals on the calyx-tube. Styles 2–5, mostly 5, united at the base. Ovary 5-celled, seeds many in each cell. Fruit a pome, globose, usually depressed or hollowed at the extremities, flesh without hard grains.*

1. **C. vulgaris, Pers.** QUINCE. Shrub 6–12 ft. high. Leaves oblong-ovate, acute at the apex, obtuse at the base, entire, downy below. Flowers large, white or pink. Fruit ovoid, downy. Cultivated.*

2. **C. japonica, Pers.** JAPAN QUINCE. A widely branching shrub, 3–6 ft. high, branches with numerous straight spines. Leaves ovate-lanceolate, acute at each end, smooth and shining, serrulate; stipules conspicuous, kidney-shaped. Flowers in nearly sessile axillary clusters, bright scarlet. Fruit globose. Common in cultivation.*

IV. PYRUS, L.

Trees. Leaves simple, stipules small, deciduous. Flowers in cymes, large, white or pink. Calyx urn-shaped, adnate to the ovary, 5-cleft, its lobes acute. Petals rounded, short-clawed. Stamens numerous, borne with the petals on the calyx-tube. Styles 5, distinct or slightly united at the base. Fruit a pome, with about 2 seeds in each carpel.*

1. **P. communis, L.** PEAR. A tree, often very large, head usually pyramidal; branches often thorny. Leaves thick and leathery,

ovate or oval, acute, finely serrate or entire, downy when young, becoming smooth with age; petioles slender. Cymes few–several-flowered, terminal, and at the ends of "fruit spurs" grown the previous season. Flowers white. Styles not united. Fruit obovoid, with hard gritty grains near the core. A European and Asiatic tree common in cultivation.*

2. **P. Malus.** APPLE. A tree with a rounded top and dark-colored bark. Leaves oval or ovate, obtuse or pointed, dentate or nearly entire, rounded at the base, smooth above, downy beneath. Cymes few–many-flowered. Flowers large, white or pink. Calyx downy. Fruit depressed-globose to ovoid, hollowed at the base and usually at the apex. Cultivated from Europe and often running wild in old pastures, etc., E.*

3. **P. coronaria, L.** AMERICAN CRAB APPLE. A small tree with smooth bark. Leaves triangular or oval-lanceolate, acutish or rounded or a little heart-shaped at the base, cut-serrate and often somewhat 3-lobed, slender-petioled, soon smooth. Flowers large, few in a cluster, pale rose-color, very sweet-scented. Fruit bright green, turning yellowish, sometimes 1½ in. in diameter, flattened at right angles to the pedicels, very fragrant. Glades, W. N. Y., West and South.

4. **P. angustifolia, Ait.** NARROW-LEAVED CRAB APPLE. A small tree with smooth, light gray bark. Leaves lanceolate or oblong, serrate, downy when young, acute at the base, short-petioled. Corymbs few-flowered. Flowers pink, fragrant, about 1 in. broad. Styles smooth, distinct. Fruit nearly globose, about ¾ in. in diameter, very sour. In open woods, Penn., W. and S.*

5. **P. arbutifolia, L. f.** CHOKEBERRY, CHOKE PEAR, DOGBERRY. A shrub 5–8 ft. high. Leaves oblong or oblanceolate, finely serrate, downy beneath, short-petioled. Flowers in a downy compound cyme, small, white or reddish. Fruit pear-shaped or nearly globular, not larger than a currant, very dark purple, dry and puckery. There is also a smooth-leaved variety with black fruit. Swamps and damp thickets, especially N. E.

6. **P. americana, DC.** AMERICAN MOUNTAIN ASH. A tall shrub or small tree. Leaves odd-pinnate. Leaflets oblong-lanceolate, taper-pointed, sharply serrate, smooth, bright green. Flowers small, white, in large, flat, compound cymes. Fruit bright scarlet, not larger than currants. Common N. and often cultivated.

7. **P. Aucuparia, Gaertn.** EUROPEAN MOUNTAIN ASH OR ROWAN TREE. Larger than No. 6. Leaflets paler, downy beneath. Fruit larger, about ½ in. in diameter. Cultivated from Europe.

V. AMELANCHIER, Medic.

Shrubs or small trees with smooth gray bark. Leaves simple, sharply serrate, petioled. Flowers white, in racemes. Calyx-tube 5-cleft, adnate to the ovary. Petals oblong. Styles 5, united below. Ovary 5-celled, 2 ovules in each cell, often only 1 maturing. Fruit small, berry-like.*

1. **A. canadensis, Torr. and Gr.** SERVICE BERRY, JUNE BERRY, SHAD BUSH, SUGAR PLUM, SUGAR PEAR, WILD PEAR. A small tree, branches downy when young, soon becoming smooth. Leaves ovate to elliptical, finely and sharply serrate, acute at the apex, usually obtuse or cordate at the base. Racemes slender, many-flowered, appearing before or with the leaves. Flowers showy. Petals 4 or 5 times the length of the smooth sepals. Fruit globose, dark red, edible. In rich woods; extremely variable in height, and in shape of leaves.*

VI. CRATÆGUS, L.

Shrubs or small trees, mostly with numerous strong spines, wood very hard. Leaves serrate, lobed or deeply incised, petioled. Flowers white or pink, in terminal corymbs or sometimes solitary. Calyx-tube urn-shaped, 5-cleft, the limb persistent. Petals round. Stamens few or many. Styles 1–5, distinct; ovules 1 in each cell. Fruit a small pome with bony carpels.* [The species are hard to distinguish and are not very perfectly defined. At present the genus is undergoing a careful revision by Professor C. S. Sargent.]

1. **C. coccinea, L.** SCARLET-FRUITED THORN, RED HAW. A tall shrub or small tree, with smooth, reddish branches, but the young shoots downy. Leaves thin, roundish-ovate, cut-lobed or sharply toothed, slender-petioled. Flowers large, in a many-flowered corymb. Fruit bright red, nearly globular or obovoid, ½ in. long.

Var. mollis, Torr. and Gr., has the young shoots densely covered with down and fruit twice the length of the preceding, sweet and edible. Common in the Mississippi valley.

2. **C. tomentosa, L.** PEAR THORN. A small tree, the young shoots, peduncles, and calyx downy or soft-hairy. Leaves large, thickish, ovate or ovate-oblong, downy beneath, doubly serrate or cut-lobed. Flowers later than No. 1, sometimes 1 in. in diameter. Fruit scarlet or orange, rather less than 1 in. long, edible.

3. **C. Crus-Galli, L.** COCKSPUR THORN. Small trees with spreading branches; spines usually numerous, long and stout, but some-

times few or wanting. Leaves thick, oval or obovate, shining above, paler below, obtuse or acute, and sharply serrate at the apex, wedge-shaped and entire at the base. Corymbs terminal, many-flowered, smooth; flowers about ½ in. wide; styles 1–3; fruit red, subglobose, ½ in. in diameter. Common in open woods.*

4. **C. spathulata, Michx.** SMALL-FRUITED HAW. A small tree, young twigs densely downy; spines 1–2 in. long; leaves small, spatulate, crenate at the rounded apex, entire and wedge-shaped below, leathery, smooth; stipules crescent-shaped; corymbs compound, many-flowered; flowers small; calyx-lobes very short; styles 5; fruit red, about the size of a small pea. On river banks.*

5. **C. flava, Ait.** YELLOW HAW. A small tree with very numerous spines; leaves obovate, glandular-serrate at the rounded apex, cuneate below, downy when young; petiole short; corymbs few-flowered, slightly downy; flowers ½–¾ in. wide; calyx-lobes entire or glandular-serrate; styles 4–5; fruit pear-shaped, ½ in. or more in length, greenish-yellow. On sandy soil.*

VII. RUBUS, L.

Mostly prickly shrubs, producing runners. Leaves alternate, simple or compound; stipules adnate to the petiole. Flowers in terminal and axillary clusters, rarely solitary, white (in one American species [No. 1] purple rose-color). Calyx free from the ovary, with a broad tube; its lobes 5, persistent. Petals 5. Stamens many. Carpels many, distinct, on a convex receptacle. Fruit a cluster of little 1-seeded stone-fruits on a dry or somewhat juicy receptacle.

A. RASPBERRIES.

Grains of the fruit, when ripe, falling off from the receptacle and leaving the latter with the calyx.

1. **Rubus odoratus, L.** FLOWERING RASPBERRY (often wrongly called MULBERRY). Stems shrubby and rather stout, 3–5 ft. high, not prickly, the young shoots, peduncles, and calyx covered with sticky glandular hairs. Leaves large, simple, 3–5-lobed. Flowers showy, rose-purple, 1–2 in. in diameter, on many-flowered peduncles. Fruit flattish, eatable. Rather common E. and N. and often cultivated.

2. **R. triflorus, Richardson.** DWARF RASPBERRY (also wrongly known as MULBERRY). A slender trailing plant, almost entirely herbaceous, not prickly but sometimes bristly. Leaves compound,

usually of 3 but sometimes of 5 thin ovate-lanceolate, frequently unsymmetrical leaflets, which are coarsely doubly serrate and often cleft or lobed, with a shining upper surface. Flowers small, on 1–3-flowered peduncles. Fruit of a few loosely cohering grains, eaten by children. Common, especially N., in hilly woods, often forming a dense carpet in the partial shade of pines.

3. **R. occidentalis, L.** BLACK RASPBERRY. Stems long and slender, often recurved and rooting at the tips, armed with weak, hooked prickles. Leaves petioled, 3–5 ovate leaflets, coarsely serrate, white-downy below. Flowers white, in compact terminal corymbs. Pedicels erect or ascending. Fruit black, hemispherical, separating easily from the receptacle. Common on borders of woods Mo. and N., widely cultivated.*

4. **R. strigosus, Michx.** RED RASPBERRY. Stems widely branching, biennial, not rooting at the tips, armed with weak bristles and with a few hooked prickles. Leaves petioled, of 3–5 ovate leaflets which are sharply serrate and sometimes lobed, downy beneath. Flowers in terminal and axillary racemes and panicles, pedicels drooping. Fruit hemispherical or conical, red, separating easily from the receptacle. Common on mountains and burned clearings. Iowa and N. and widely cultivated.*

B. BLACKBERRIES.

Grains of the ripe fruit falling from the calyx along with the soft, eatable receptacle.

5. **R. nigrobaccus, Bailey.** HIGH BLACKBERRY. Stem shrubby, erect or bending, 4–10 ft. high, glandular-downy above and with stout, hooked prickles below. Leaves petioled, of 3–7 ovate leaflets which are acute, irregularly serrate, smooth or soft-hairy. Flowers in terminal, bracted panicles. Petals white, obovate, much longer than the taper-pointed sepals. Fruit large, black, oblong. Common in thickets.*

6. **R. villosus, Ait.** LOW BLACKBERRY, DEWBERRY. Stems shrubby, trailing widely, from 3–10 ft. long, somewhat prickly. Leaflets usually 3, but sometimes 5 or 7, ovate, acute, sharply (and doubly) cut-serrate, thin. Racemes upright on the short branches, 1–3-flowered. Fruit roundish, of fewer and larger grains than No. 5, very sweet when fully ripe. Common N., in stony or gravelly fields.

7. **R. cuneifolius, Pursh.** SAND BLACKBERRY. Stem shrubby, erect or diffuse, 2–3 ft. high; prickles straight or recurved. Leaves petioled, 3–5-foliate; leaflets obovate, serrate towards the apex, wedge-shaped towards the base, rough above, white downy-woolly beneath. Racemes mainly terminal, few-flowered. Petals white,

longer than the sepals. Fruit ovoid, black, smaller than the preceding. Common in old fields.*

8. **R. hispidus, L.** Stem trailing or prostrate, often several feet in length, armed with small, straight, or recurved prickles, and often thickly set with bristles. Leaves petioled, mostly of 3 leaflets; leaflets obovate, obtuse, rather coarsely serrate. Flowering branches commonly erect, few-flowered, flowers white. Fruit black. Common on dry, sandy soil.*

VIII. WALDSTEINIA, Willd.

Stemless perennial herbs. Leaves 3–5-lobed or divided. Flowers several, rather small, yellow, on a bracted scape. Calyx-tube top-shaped; the limb spreading, with sometimes little bracts alternating with the lobes. Petals 5. Stamens many. Style 2–6. Akenes few, on a dry receptacle.

1. **W. fragarioides, Tratt.** BARREN STRAWBERRY. A low herb with much the appearance of a strawberry plant. Leaflets 3, broadly wedge-shaped, crenate-dentate. Scapes many-flowered; the flowers rather pretty. Wooded hillsides.

IX. FRAGARIA, Tourn.

Perennial scape-bearing herbs, with runners. Leaves with 3 leaflets; stipules adnate to the petiole. Flowers (of American species) white. Calyx free from the ovary, 5-parted, 5-bracted, persistent. Petals 5. Stamens many. Carpels many, on a convex receptacle. Akenes of the ripe strawberry many, very small, more or less imbedded in the large, sweet, pulpy receptacle.

1. **F. virginiana, Mill.** WILD STRAWBERRY. Leaflets thick, oval to obovate, coarsely serrate, somewhat hairy. Scape usually shorter than the petioles, few-flowered. Fruit ovoid, akenes imbedded in deep pits. Common.*

2. **F. vesca, L.** EUROPEAN STRAWBERRY. Leaflets ovate or broadly oval, dentate above, wedge-shaped below, slightly hairy. Scape usually longer than the petioles. Fruit globular or oval, akenes adherent to the nearly even surface of the receptacle. Common in cultivation. Many of the cultivated varieties of strawberry are hybrids between the two described above. The American form is less hairy than the European and is by some regarded as distinct.*

X. POTENTILLA, L.

Perennial herbs, rarely shrubs. Leaves compound; stipules adnate to the petiole. Flowers white or yellow, rarely red; solitary or in cymes. Calyx free from the ovary, 5-cleft, with 5 little bracts alternating with its lobes. Petals 5. Stamens many. Carpels usually many, on a dry convex or concave receptacle; styles falling off from the akenes as they mature.

1. **P. arguta, Pursh.** UPRIGHT CINQUEFOIL. An erect, stout hairy plant, 1–4 ft. high. Root-leaves long-petioled, pinnate. Stem-leaves few, each of 3–7 leaflets, the latter broadly ovate and cut-toothed or serrate, downy underneath. Flowers large, in dense terminal clusters; the petals whitish or cream-color. Rocky hills.

2. **P. canadensis, L.** COMMON CINQUEFOIL. Stems slender, procumbent, silky-hairy, sending out long runners. Leaflets obovate wedge-shaped, appearing like 5 from the divisions of the 2 lateral ones. Peduncles 1-flowered in the axils of the leaves. Flowers yellow. Common in dry pastures and a troublesome weed.

3. **P. argentea, L.** SILVERY CINQUEFOIL. Stems prostrate or ascending and branching, woolly. Leaflets oblong, wedge-shaped, those of the upper leaves very narrow, with a few large, deeply cut teeth, smooth and green above, silvery beneath, with a dense coat of white wool. Flowers small and somewhat clustered, yellow. Dry fields and roadsides.

XI. GEUM, L.

Erect perennial herbs. Radical leaves crowded, pinnate, with a very large terminal leaflet. Flowers and fruit much as in *Potentilla*, but the akenes tailed with the remains of the styles.

1. **G. album, Gmelin.** WHITE AVENS. Stem erect, branching above, smooth or finely downy, 18–24 in. high. Radical leaves pinnate, or the earliest simple and rounded, long-petioled, serrate or dentate, terminal lobe larger than the lateral lobes; stem-leaves short-petioled, 2–5-lobed or parted. Flowers on slender peduncles. Petals white, not longer than the sepals. Styles jointed near the middle, the lower portion persistent and hooked. Ovaries and receptacle hairy, head of fruit globose. Rich woods.*

2. **G. virginianum, L.** Stem 2–3 ft. high, stout and bristly hairy. Lower leaves and root-leaves pinnate, varying greatly; upper leaves mostly of 3 leaflets or 3-parted. Petals white or pale yellow,

small, shorter than the calyx-lobes. Heads of fruit large, on stout, hairy peduncles; the receptacle nearly or quite smooth. Borders of woods and damp thickets.

3. G. rivale, L. WATER AVENS, PURPLE AVENS, CHOCOLATE ROOT. Stem 1½–2 ft. high, somewhat downy or hairy, simple or nearly so. Root-leaves lyrate and somewhat pinnate, with the divisions irregular; stem-leaves few, of 3 leaflets or 3-lobed. Flowers rather large. Petals purplish-yellow, as long as the brownish-purple calyx-lobes. Styles long, purplish; stigmas thread-like, feathered with soft hairs, especially in fruit. Wet meadows.

XII. ROSA, Tourn.

Erect, running or climbing prickly shrubs. Leaves pinnate, leaflets serrate, stipules adnate to the petiole. Calyx-tube urn-shaped, with a rather narrow mouth. Petals (in single roses) 5. Stamens many, inserted around the inside of the mouth of the calyx-tube. Ovaries many, hairy, ripening into bony akenes, enclosed in the rather fleshy and sometimes eatable calyx-tube.

1. R. blanda, Ait. EARLY WILD ROSE. Stems 1–3 ft. high, usually without prickles; stipules broad. Flowers generally large, corymbed or solitary; sepals after flowering closing over the mouth of the calyx-tube and persistent. Rocks and rocky shores.

2. R. carolina, L. SWAMP ROSE. Stems 4–8 ft. high, with stout and generally recurved prickles. Stipules long and narrow; leaflets commonly downy beneath, finely serrate. Flowers several in a corymb, bright rose-color. Sepals spreading and falling off after flowering. Damp woods and borders of swamps.

3. R. lucida, Ehrh. DWARF WILD ROSE. Stems varying in height from less than a foot to 6 ft., with stout, somewhat hooked prickles. Stipules rather broad; leaflets small, thickish and glossy above, coarsely toothed toward the tip. Flowers corymbed, or solitary, pale rose-color. Sepals spreading and falling off after flowering. Moist ground and swamps.

4. R. humilis, Marsh. PASTURE ROSE. Stem erect, branched, usually armed with stout stipular prickles and with bristles, but sometimes nearly smooth, 1–3 ft. tall. Leaves mostly of 5 leaflets; stipules entire; leaflets oblong-lanceolate or oval, shining above, pale beneath, sharply serrate. Flowers solitary or 2–3 together, 2–3 in. broad, pink. Peduncles and calyx glandular-downy. Calyx-lobes leaf-like, spreading, finally deciduous. Styles distinct. Fruit globose, bristly hairy. On dry soil; our most common wild rose. S.*

5. **R. rubiginosa, L.** SWEETBRIER. Stem erect or curving, armed with stout recurved prickles. Leaves with 5–7 leaflets, the latter broadly oval, coarsely serrate, glandular-bristly beneath, aromatic. Flowers white or pink. Sepals widely spreading, deciduous. Fruit obovate, slightly bristly. Common in cultivation and sometimes wild.*

XIII. PRUNUS, Tourn.

Trees or shrubs. Leaves simple, with stipules, which are often small or fall off early. Calyx with a bell-shaped or urn-shaped tube and 5-lobed spreading limb, falling off after flowering. Petals 5. Stamens 3–5 times as numerous, or indefinite, inserted on the throat of the calyx-tube. Pistil 1, long-styled, with 2 ovules, ripening into a single stone-fruit.

A. *Stone oval, compressed; fruit smooth when ripe. Branches often spiny. (Plums.)*

1. **P. americana, Marsh.** WILD PLUM. A small tree, bark thick and rough, branches spiny. Leaves ovate or obovate, acuminate at the apex, rounded or cordate at the base, sharply serrate, rather thick, downy beneath; petioles glandular. Flowers in lateral, sessile umbels, appearing with or before the leaves; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long, flowers $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter. Calyx downy within; fruit globose, red or yellow, $\frac{1}{2}$–1 in. in diameter. Common in woods.*

2. **P. angustifolia, Michx.** CHICKASAW PLUM. A small tree with spiny branches. Leaves lanceolate or oblong-lanceolate, acute at the apex, usually obtuse at the base, finely and sharply serrate, rather thin, smooth. Flowers in lateral, sessile umbels, pedicels short. Calyx smooth. Fruit yellowish-red, subglobose, skin thin, stone only slightly compressed. In old fields, S.*

B. *Stone deeply furrowed and pitted; fruit downy when ripe. Branches not spiny. (Peaches and almonds.)*

3. **P. persica, Sieb. and Zucc.** PEACH. A tree with a rounded top; bark nearly smooth. Leaves lanceolate, taper-pointed, finely serrate, smooth on both sides; petioles usually bearing 2 or 4 crescent-shaped or cup-shaped glands. Flowers pink, scaly-bracted. Fruit ovoid, with a seam along one side. Often escaped from cultivation.*

C. *Stone more or less spherical; fruit smooth when ripe. Branches not spiny. (Cherries.)*

4. **P. virginiana, L.** CHOKECHERRY. A shrub or small tree, 5–20 ft. high. Leaves thin, oval or obovate, pale, pointed, sharply serrate. Flowers small, white, in short racemes. Fruit bright red, turning at length to dark crimson, very puckery until fully ripe. River banks and thickets.

5. **P. serotina, Ehrh.** WILD BLACK CHERRY. Often becoming a large tree; bark on old trees rough, nearly black. Leaves rather thick, oval to lanceolate-ovate, acute or taper-pointed at the apex, finely serrate with calloused teeth, smooth above, downy on the veins beneath. Racemes terminal, long and spreading. Flowers white. Fruit globose, about ¼ in. in diameter, purplish-black. In rich woods. Wood much used in cabinet-making.*

6. **P. Cerasus, L.** CHERRY. Often becoming a large tree. Leaves oval or ovate, acute or taper-pointed at the apex, rounded at the base, irregularly serrate-dentate, smooth on both sides, resinous when young. Flowers in lateral umbels, white; pedicels long and slender. Fruit globose, red or black. This is the European species from which most of our cultivated varieties have been developed.*

46. LEGUMINOSÆ. PULSE FAMILY.

Herbs, shrubs, or trees. Leaves alternate, usually compound (either pinnately or palmately), with stipules, the leaflets mostly entire. Calyx of 5 sepals, which are more or less united, often somewhat irregular. Corolla, of 5 petals, often

FIG. 14.—I, Diagram of Flower of Sweet Pea, *Lathyrus odoratus*. II, Vertical Section of Flower (magnified). III, Calyx (magnified).

FIG. 15.—I, Stamens and Pistil of Sweet Pea (magnified). II, Fruit. III, Part of Fruit, showing one seed.

papilionaceous or somewhat regular, in No. XV much reduced. Stamens diadelphous (Fig. 15), monadelphous, or distinct. Ovary simple, free from the calyx. Fruit usually a 1-celled pod (Fig. 15). Seeds one or several, without endosperm.

A.

Flower regular, small. Stamens hypogynous. Leaves twice pinnate.

Petals not united to each other. Stamens 5 or 10. Pod smooth. Desmanthus, I.

Corolla gamopetalous, 5-cleft. Stamens 8 or 10. Pod minutely prickly or rough. Schrankia, II.

B.

Trees. Flowers somewhat or not at all papilionaceous; sometimes almost regular. The upper petal inside the others in the bud. Stamens 10 or less, usually not united to each other, borne on the calyx.

Flowers imperfectly papilionaceous. Leaves simple. Cercis, III.

Flowers not papilionaceous. Thornless. Gymnocladus, IV.

Flowers not papilionaceous. Thorny. Gleditschia, V.

C.

Herbs or trees. Flowers decidedly papilionaceous. The upper petal external in bud and enclosing the others. Stamens 10, not united to each other.

Trees. Cladrastis, VI.

Herbs. Baptisia, VII.

D.

Shrubs with a corolla of one petal only. Amorpha, XV.

E.

Herbs, shrubs, or trees. Flowers decidedly papilionaceous. Stamens monadelphous or diadelphous (in the latter case usually 9 and 1, as in Fig. 15).

1. Stamens with anthers of two forms. Leaves palmately compound.
   Herbs. Leaves with many leaflets. Lupinus, VIII.
   Trees. Laburnum, IX.
   Low shrubs. Cytisus, X.
2. Anthers all alike except in No. 14.
   Leaves usually with 3 leaflets. Leaflets with fine teeth, except in No. 14.
   (*a*) Pod coiled. Medicago, XI.
   (*b*) Pod not coiled. Flowers in racemes. Melilotus, XII.
   (*c*) Pod not coiled. Flowers in heads. Trifolium, XIII.
   (*d*) Leaflets entire. Psoralea, XIV.
3. Leaves odd-pinnate, with more than 3 leaflets.
   (*e*) Low woody shrubs. Amorpha, XV.
   (*f*) Tall twining shrubs. Wistaria, XVI.
   (*g*) Trees. Robinia, XVII.
   (*h*) Herbs. Astragalus, XVIII.
4. Leaves pinnate, the midrib prolonged into a tendril.
   (*i*) Leaflets usually many pairs. Style slender, bearded only at the tip or all round the upper portion. Pod 2–several-seeded. Vicia, XIX.
   (*j*) Leaflets few or several pairs. Style bearded along one face only. Pod several-seeded. Lathyrus, XX.
   (*k*) Leaflets 1–3 pairs. Style enlarged above, grooved on the back. Pod several-seeded; seeds large, globular or nearly so. Pisum, XXI.

I. DESMANTHUS, Willd.

Shrubs or perennial herbs; stems erect or diffuse, smooth. Leaves abruptly twice-pinnate; stipules small. Flowers in heads or spikes, on axillary peduncles, the upper perfect, the lower often staminate or neutral. Calyx 5-toothed. Corolla of 5 distinct petals or 5-cleft. Stamens 5–10, distinct. Ovary nearly sessile, flat, several-seeded.*

1. **D. brachylobus, Benth.** DESMANTHUS. Stem erect or ascending, smooth, 1–4 ft. high. Pinnæ 6–14 pairs, each with a minute gland at the base; leaflets 20–30 pairs, small, linear. Heads globose. Stamens 5. Pods several, on a peduncle 2–3 in. long, curved, flat, 2-valved, 3–6-seeded. Open, sandy fields.*

II. SCHRANKIA, Willd.

Perennial herbs; stems reclining or prostrate, prickly, 2–5 ft. long. Leaves twice-pinnate; stipules bristly. Flowers perfect or somewhat monœcious, in axillary peduncled heads. Calyx minute. Corolla tubular, 5-cleft. Stamens 8–10, distinct. Pod long, prickly, 1-celled.*

1. **S. uncinata, Willd.** SENSITIVE BRIER, SENSITIVE ROSE, SHAME VINE. Plant covered with hooked prickles. Leaflets elliptical, with a conspicuous network of veins beneath; leaves closing gradually after being touched. Flowers rose-colored. Pods nearly cylindrical, 2 in. long. Dry, sandy soil and rolling prairies, especially S. and W.

III. CERCIS, L.

Trees. Leaves simple with stipules. Flowers in axillary clusters, papilionaceous. Calyx bell-shaped, 5-toothed. Stamens 10, distinct. Ovary short-stalked; ovules several. Fruit a flattened pod.

1. **C. canadensis, L.** REDBUD. A small tree, 10–20 ft. high, wood hard but weak, bark smooth, dark-colored. Leaves broadly cordate, abruptly acute, rather thick, very smooth above, often slightly downy below. Flowers several in a cluster, appearing before the leaves, pinkish-purple. Pod oblong, compressed, many-seeded. Common on rich soil, especially S.*

IV. GYMNOCLADUS, Lam.

A large, thornless tree, its twigs few and stout. Leaves very large, twice pinnately compound, without stipules. Flowers regular, whitish, dicœcious or somewhat monœcious, in racemes at the ends of the branches. Calyx-tube rather long, its 5 lobes spreading. Petals oblong, all alike, inserted with the stamens on the throat of the calyx. Stamens of the fertile flowers usually not pollen-bearing. Pod hard, flat,

partly filled with a sweet substance, slow in opening. Seeds several, flattish, over ½ in. in diameter, very hard and shining.

1. G. canadensis, Lam. KENTUCKY COFFEE TREE. Tree 50 ft. or more in height, with rough gray bark. Leaves 2–3 ft. long, the leaflets vertical. Pods sometimes nearly 1 ft. long. Rich soil and river bottoms, especially S. and W.

V. GLEDITSCHIA, L.

Large trees; bark dark-colored, nearly smooth. Leaves usually pinnately twice compound; leaflets serrate. Flowers somewhat monœcious, in small spike-like racemes. Calyx spreading, 3–5-cleft. Petals as many as the sepals and inserted at the summit of the tube. Stamens 5–10, distinct, inserted with the petals. Ovary nearly sessile, ovoid or elongated. Fruit a 1 or many seeded, leathery pod.*

1. G. Triacanthos, L. HONEY LOCUST. A large tree, usually armed with stout, branched thorns, which are sometimes a foot or more in length. Leaves petioled; leaflets short-stalked, lanceolate-oblong, base inequilateral, smooth above, often downy below. Racemes solitary or in small clusters, drooping. Flowers inconspicuous, greenish. Pod linear-oblong, often 12–15 in. long by 1 in. wide, twisted, many-seeded, smooth and shiny, pulpy within. In rich woods. [The thorns are plainly modified branches bearing dormant buds, and often partially developed leaves. The early spring leaves are usually only once compound, while those of later growth are almost invariably twice compound. Often a single leaf will show both forms of compounding.]*

VI. CLADRASTIS, Raf.

A moderate-sized tree with smooth dark gray bark and yellow wood. Leaves of 7–11 smooth oval or ovate leaflets. Flowers creamy-white, in long, drooping panicles. Calyx 5-toothed. Standard large, nearly round, reflexed; petals of the keel and wings separate and straight. Stamens 10, unconnected with each other. Pod borne on a short stalk above the calyx. Seeds 4–6.

1. C. tinctoria, Raf. YELLOW WOOD. Tree 50 ft. or less in height, much branched, with a round, spreading top. Hillsides, in fertile soil, south central states. Also considerably planted as a shade tree.

VII. BAPTISIA, Vent.

Perennial herbs; stems erect, widely branched. Leaves simple or palmate, of 3 leaflets. Flowers in racemes. Calyx 4–5-lobed, persistent, the upper lobe usually longer and notched; standard rounded, its sides reflexed, wings about as long as the keel. Stamens 10, distinct. Pod stalked, long-pointed by the remains of the style. Plants usually becoming black in drying.*

1. **B. tinctoria, R. Br.** WILD INDIGO. Stem smooth, slender, 2–4 ft. high; branches slender. Leaves of 3 leaflets, on short petioles, the upper nearly sessile; stipules minute, quickly deciduous. Leaflets obovate to oblanceolate, obtuse at the apex, wedge-shaped at the base, entire. Racemes numerous, terminal. Flowers yellow, ½ in. long. Pod globose, ovoid, on a stalk about the length of the calyx, point long and slender. Plant blackening in drying. Common on dry, sandy soil.*

2. **B. leucophæa, Nutt.** Low, hairy, and branching. Leaves nearly sessile, leaflets oblanceolate or obovate-spatulate. Stipules triangular-ovate, large, persistent; bracts large and leaf-like. Racemes long. Flowers large, yellowish-white. Pod ovoid, swollen. Prairies and open woods, W. and S.

3. **B. leucantha, Torr. and Gr.** Stout, smooth, and covered with a bloom, 3 ft. or more high, with spreading branches. Petioles short; lanceolate stipules and bracts falling off early. Racemes erect. Flowers large, white. Pods ellipsoidal, 2 in. long, borne on a stalk twice as long as the calyx. Rich river bottoms and prairies.

4. **B. alba, R. Br.** WHITE WILD INDIGO. Stem smooth and with a bloom, often purple, 2–3 ft. high; branches slender, spreading. Leaves petioled, with 3 leaflets; stipules minute, soon deciduous. Flowers white, mostly in a single raceme which is 1–3 ft. long, with occasionally lateral, few-flowered racemes. Pod linear-oblong, the point very slender and soon deciduous. Plant unchanged in drying. In damp soil.*

5. **B. australis, R. Br.** BLUE FALSE INDIGO. Stem smooth, stout, 2–4 ft. high. Leaves of 3 leaflets, short-petioled; stipules lanceolate, persistent, longer than the petioles; leaflets oblong, wedge-shaped or narrowly obovate, entire. Flowers bright blue, 1 in. long, in terminal, erect, loosely flowered racemes; stalk about the length of the calyx. Pod oblong, with a slender, persistent point. Banks of rivers; often cultivated for ornament.*

VIII. LUPINUS, Tourn.

Biennial or perennial herbs. Leaves simple or palmately compound. Flowers showy, in terminal racemes. Calyx 2-lipped, 5-toothed. Standard round, with the sides reflexed, keel scythe-shaped. Stamens monadelphous, anthers alternately oblong and roundish. Ovary sessile; matured pod oblong, several-seeded, often compressed between the seeds.*

1. **L. perennis, L.** Perennial; stem erect, downy, 12–18 in. high. Leaves palmately 7–9 foliate; leaflets obovate or oblanceolate, obtuse and mucronate at the apex, slightly downy; petiole slender; stipules small. Racemes terminal, slender, loosely many-flowered. Flowers purple, blue, pink, or white. Pod oblong, densely downy, few-seeded. Dry, sandy soil.*

IX. LABURNUM, Benth.

Trees or shrubs. Leaves of 3 leaflets, with very small stipules or none. Flowers golden-yellow, in slender, drooping racemes. Calyx 2-lipped, the upper lip 2-toothed, the lower 3-toothed. Standard ovate, upright, of the same length as the straight wings. Stamens diadelphous (9 and 1). Ovary and pod somewhat stalked above the calyx, several-seeded.

1. **L. vulgare, Gris.** LABURNUM, GOLDEN CHAIN. A small tree, with smooth, greenish bark. Leaves with slender petioles; leaflets oblong-ovate, acute at the base, taper-pointed, downy beneath. Flowers showy, in graceful racemes. Cultivated from Europe.

X. CYTISUS, L.

Shrubs, rarely spiny. Leaves of 1–3 leaflets or none; stipules very small. Calyx 2-lipped, the upper lip slightly 2-toothed, the lower 3-toothed. Keel straight or a little curved, blunt, turned down after flowering. Stamens with their filaments all united; anthers every other one short and attached by its center, the alternate ones long and fastened by their bases. Style curved in, or, after the flower opens, coiled up. Pod flat, long, many-seeded.

1. **C. canariensis, Steud.** A shrub with many rather stiff, erect, slender branches. Leaves abundant, very small, covered with soft

gray hairs; leaflets 3, obovate. Flowers rather small, yellow, in somewhat erect racemes. Cultivated in greenhouses. From the Canary Islands.

XI. MEDICAGO, Tourn.

Annual or perennial herbs; leaves petioled, of 3 toothed leaflets. Flowers in terminal and axillary spikes or racemes. Calyx 5-toothed, the teeth short and slender. Standard oblong, much longer than the wings or keel. Stamens 10, diadelphous. Ovary sessile. Pod 1–several-seeded, coiled, not splitting open, often spiny.*

1. **M. sativa, L.** ALFALFA. Perennial; stems erect, branching, downy when young, becoming smooth with age, 2–3 ft. high. Leaves short-petioled; leaflets obovate, sharply dentate towards the apex, obtuse or sometimes notched or mucronate; stipules lanceolate, entire. Flowers blue, small, in rather close spikes; pods downy, coiled, few-seeded. Introduced from Europe, and cultivated for hay and pasture.*

2. **M. lupulina, L.** BLACK MEDICK, NONESUCH. An annual or biennial, much branched, reclining herb, with stems from 6–20 in. long. Leaves very short-petioled; leaflets obovate, acute, $\frac{1}{4}$–$\frac{3}{8}$ in. long, toothed near the tip. Flowers small, yellow, in short spikes. Pods very small, 1-seeded, kidney-shaped, black. Roadsides and waste ground, introduced from Europe.

XII. MELILOTUS, Tourn.

Annual or biennial herbs. Leaves petioled, of 3 leaflets. Flowers small, white or yellow, in dense axillary and terminal racemes. Calyx 5-toothed, the teeth nearly equal. Standard erect, wings and keel cohering. Stamens 10, diadelphous. Pod longer than the calyx, 1–4-seeded.*

1. **M. alba, Lam.** MELILOTUS. Biennial; stem erect, branching, smooth or the young branches slightly downy. Leaflets oblong or oblanceolate, rounded or truncate at the apex, serrate; stipules small. Racemes long, slender, erect. Flowers white. Standard longer than the wings and keel. Pod ovoid, wrinkled, drooping, mostly 1-seeded, scarcely opening. Common as a weed and widely cultivated.*

2. **M. officinalis, Willd.** YELLOW SWEET CLOVER. A stout, upright, branching herb, 2–4 ft. high, looking much like the preceding species, but coarser. Flowers yellow. Waste ground and roadsides. Introduced from Europe.

XIII. TRIFOLIUM, Tourn.

Annual, biennial, or perennial herbs. Stems more or less spreading. Leaves petioled, of 3 toothed or serrate leaflets; stipules adnate to the petioles. Flowers white, yellow, or red, in heads. Calyx 5-cleft, the teeth nearly equal and subulate. Petals withering-persistent, keel shorter than the wings. Stamens diadelphous. Pod smooth, 1–6-seeded, scarcely opening.*

1. **T. procumbens, L.** LOW HOP-CLOVER. Annual; stem slender, erect, or spreading, downy, 6–10 in. long. Leaves short-petioled; leaflets obovate or obcordate, finely dentate, the middle one distinctly stalked; stipules lanceovate. Flowers yellow, reflexed in fruit. Pod 1-seeded. Common on clay soil, in waste places.*

2. **T. incarnatum, L.** CRIMSON CLOVER. Annual; stem erect, somewhat branched, downy, 1–2 ft. high. Lower leaves long-, the upper short-petioled; leaflets obovate or wedge-shaped, toothed at the apex. Flowers bright crimson, sessile, in terminal heads which finally become much elongated. Calyx silky, its lobes long and plumose. Introduced and cultivated for fodder.

3. **T. pratense, L.** RED CLOVER. Biennial or short-lived perennial; stems spreading, branching, downy, 1–3 ft. long. Leaves long-petioled; stipules large; leaflets oval to obovate, finely toothed, often with a dark triangular spot near the center. Flowers red or purple, in globose heads, erect in fruit. Calyx-teeth bristle-shaped, hairy. Pod 1–3 seeded. Introduced and widely cultivated.*

4. **T. carolinianum, Michx.** CAROLINA CLOVER. Perennial; stems spreading or ascending, much-branched, downy, 6–10 in. long. Leaves short-petioled; leaflets small, obovate or obcordate, slightly toothed. Heads small, globose, on long peduncles. Flowers white, tinged with purple, reflexed in fruit. Pod 4-seeded. Common in waste places S.*

5. **T. repens, L.** WHITE CLOVER. Perennial; stems widely branching at the base, prostrate and creeping, nearly smooth, 6–12 in. long. Leaves long-petioled; leaflets oval, obovate or obcordate, minutely toothed. Heads globose, long-peduncled. Flowers white, reflexed in fruit. Pod 3–4-seeded. Introduced; common about houses and in pastures.*

6. **T. hybridum, L.** ALSIKE CLOVER. Perennial, considerably resembling No. 5, but the stems more upright and stouter. Leaflets varying from broadly ovate to ovate-lanceolate, mucronate or slightly notched, the margins fringed with hairs; stipules prolonged into bristle-like points. Flowers rose-color and white, very fragrant. In fields and along roadsides. Introduced from Europe.

XIV. PSORALEA, L.

Perennial herbs; whole plant glandular-dotted. Leaves of 3–5 leaflets; stipules cohering with the petioles. Flowers in axillary or terminal spikes or racemes. Calyx 5-cleft, the lobes nearly equal. Standard ovate or orbicular, keel incurved, obtuse. Stamens monadelphous or diadelphous, 5 of the anthers often undeveloped. Ovary nearly sessile. Pod included in the calyx, often wrinkled, remaining closed, 1-seeded.*

1. **P. melilotoides, Michx.** SAMSON'S SNAKEROOT. Stem erect, slender, branching above, downy, 1–2 ft. high. Leaves of 3 leaflets; petioles shorter than the leaflets; stipules awl-shaped; leaflets elliptical or oblong-lanceolate, sparingly glandular-dotted, the terminal one stalked. Loosely flowered spikes axillary and terminal, on peduncles much longer than the leaves. Flowers blue or purple, about $\frac{1}{3}$ in. long. Pod compressed-globose, wrinkled transversely. Dry soil.*

2. **P. tenuiflora, Pursh.** Upright, slender, bushy and branching, 2–4 ft. high, covered when young with a fine grayish down. Leaves palmately compound, with 3–5 linear to obovate-oblong leaflets, covered with glandular dots. Flowers $\frac{1}{6}$–$\frac{1}{4}$ in. long, loosely racemed. Pod rough with glands. Prairies, W.

3. **P. esculenta, Pursh.** POMME BLANCHE, TIPSIN, DAKOTA TURNIP. Clothed with roughish hairs. Stem 5–15 in. high, erect and stout. Root turnip-shaped, starchy, eatable. Leaves palmately compound, with 5 lance-oblong leaflets. Flowers $\frac{1}{2}$ in. long, in a dense ellipsoidal spike. Pod hairy, with a pointed tip. High prairies or plains, especially N. W.

XV. AMORPHA, L.

Small shrubs, glandular-dotted. Leaves odd-pinnate. Flowers purple, blue, or white, in slender spikes or racemes. Calyx 5-toothed, persistent. Standard obovate, concave, wings and keel none. Stamens monadelphous, projecting much. Ovary sessile. Pod curved, glandular-roughened, 1–2-seeded, never opening.*

1. **A. fruticosa, L.** FALSE INDIGO. A shrub 6–15 ft. high, with smooth, dark-brown bark. Leaves petioled; leaflets 15–21, short-stalked, oblong, obtuse or notched, sparingly punctate with clear dots. Slender flowering spikes, panicled or solitary, 4–6 in. long.

Flowers blue or purple. Calyx-teeth short, nearly equal, downy. Pod glandular. River banks.*

XVI. WISTARIA, Nutt.

Tall, twining shrubs. Leaves odd-pinnate. Racemes terminal. Flowers large and showy. Calyx 2-lipped, the upper lip 2-cleft, short, the lower longer and 3-cleft. Standard large, round, with 2 calloused ridges at the base, wings eared at the base, keel scythe-shaped. Pod long, stalked, leathery, 2-valved, several-seeded.*

1. **W. frutescens, Poir.** WISTARIA. Stem climbing 30–40 ft., often 2–3 in. in diameter at the base; branches and leaves downy when young, becoming smoother with age. Leaves short-petioled; stipules minute; leaflets 9–17, ovate-lanceolate, acute at the apex, rounded at the base. Racemes large, densely flowered. Calyx downy. Corolla lilac-purple, one wing with a short and one with a long appendage at the base. Pod 2–3 in. long, 2–4-seeded. River banks S. Often cultivated for ornament.*

2. **W. chinensis, DC.** CHINESE WISTARIA. Larger and faster growing than No. 1. Racemes longer and more slender. Wing-appendages equal. Seldom fruiting in this region. Cultivated from China or Japan.

XVII. ROBINIA, L.

Trees or shrubs. Leaves odd-pinnate; stipules often spiny. Flowers showy, in axillary racemes. Calyx short, 5-toothed, the two upper teeth shorter and partially united. Standard large, orbicular, reflexed, keel obtuse. Stamens diadelphous. Style bearded on one side. Pod compressed, several-seeded.*

1. **R. Pseudacacia, L.** BLACK LOCUST. A tree of medium size; bark rough and nearly black; twigs and leaves smooth. Leaflets 9–15, ovate or oblong, obtuse and slightly mucronate at the apex; stipules forming persistent spines. Racemes loose, pendulous, 3–5 in. long. Flowers white, fragrant. Pod smooth, 4–8-seeded. Introduced and quite common; wood very durable when exposed to the weather, and extensively used for posts.*

XVIII. ASTRAGALUS, Tourn.

Mostly perennial herbs. Leaves odd-pinnate. Flowers in spikes or racemes. Calyx 5-toothed. Petals long, erect, with

claws. Standard narrow. Stamens diadelphous (9 and 1). Pod usually swollen, sometimes fleshy and eatable, several–many-seeded.

1. **A. caryocarpus, Ker.** GROUND PLUM, BUFFALO APPLE. Covered with pale, close-lying down. Leaflets narrow, oblong. Flowers violet-purple, in a short, narrow raceme. Fruit looking like a small, green, pointed plum, about $\frac{2}{3}$ in. in diameter, eatable. N. W., and S. to Texas.

2. **A. mexicanus, A. DC.** PRAIRIE APPLE. Smooth or with some loose hairs. Corolla cream-color, with the tip bluish. Fruit globular, not pointed, eatable. Prairies, Illinois and S. W.

3. **A. canadensis, L.** Erect, often tall (1–4 ft. high), more or less downy. Leaflets oblong, 21–27. Flowers pale greenish, in long spikes. Pod dry, 2-celled, sessile. River bottoms, prairies, and woods.

XIX. VICIA, Tourn.

Climbing or spreading herbs. Leaves odd-pinnate, usually ending in a tendril. Leaflets many, entire or toothed at the tip; stipules half arrow-shaped. Flowers blue, purple, or yellow, in axillary racemes. Calyx-teeth nearly equal. Wings adnate to the keel. Stamens diadelphous (9 and 1); filaments thread-shaped, anthers all alike. Style bent, smooth or downy all round or bearded below the stigma; ovules usually many. Pod flattened, 2–several-seeded. Seeds globular.

1. **V. americana, Muhl.** WILD VETCH, BUFFALO PEA. Perennial. Smooth, 1–3 ft. high. Leaflets 10–14, elliptical or ovate-oblong, obtuse. Peduncles shorter than the leaves, 4–8-flowered. Flowers bluish-purple, $\frac{3}{4}$ in. long. Common N. and W.

2. **V. caroliniana, Walt.** Perennial. Smooth or nearly so, 4–6 ft. high. Leaflets 8–24, narrowly oblong, blunt. Peduncles loosely flowered. Flowers smaller than in No. 1, whitish or tipped with pale purple. River banks.

3. **V. sativa, L.** COMMON VETCH. Annual. Stem simple, smooth or downy, reclining, 1–3 ft. long. Leaves short-petioled; leaflets 5–7 pairs, obovate-oblong to linear, obtuse, notched and mucronate at the apex. Flowers in pairs, nearly sessile in the axils, pale purple, $\frac{3}{4}$–1 in. long. Pod linear, several-seeded. Introduced from Europe and common in cultivation.*

XX. LATHYRUS, Tourn.

Like Vicia excepting that the leaflets are fewer and the style is bearded on the side toward the standard.

1. **L. venosus, Muhl.** VEINY VETCH. Perennial. Stem stout, prominently angled, climbing or reclining, 2–5 ft. long. Leaves short-petioled; stipules large, lanceolate; leaflets 5–7 pairs, broadly ovate-obtuse, mucronate. Peduncles nearly as long as the leaves, many-flowered. Flowers purple, $\frac{3}{4}$ in. long. Calyx-teeth very unequal. Pod linear, veined, 4–6-seeded. Shady banks and moist prairies.*

2. **L. maritimus, Bigelow.** BEACH PEA. Perennial. Stem stout, 1–2 ft. high. Stipules broadly ovate and heart or halberd shaped, nearly as large as the 6–12 leaflets, of which the lower pair is the largest; tendrils pretty large. Flowers large, blue or purple. Sea-shores and beaches of the Great Lakes.

3. **L. palustris, L.** WILD PEA. Stem frequently winged, slender, and climbing by delicate tendrils at the ends of the leaves. Stipules narrow and pointed; leaflets 4–8, narrowly oblong to linear, acute. Peduncles bearing 2–6 pretty large, drooping, blue, purple, and white flowers. Damp thickets and borders of swamps.

4. **L. odoratus, L.** SWEET PEA. Annual. Stem roughish-hairy, it and the petioles winged. Leaflets only one pair, oval or oblong. Flowers large, 2 or 3 on the long peduncles, sweet-scented, white, rose-color, purple, or variegated. Cultivated from Europe.

XXI. PISUM, L.

Climbing or prostrate herbs. Style enlarged above, grooved on the back, soft-hairy down on the inner edge. Leaflets 1–3 pairs. Flowers and fruit much like those of *Lathyrus*.

1. **P. sativum, L.** COMMON PEA. Annual. Smooth and covered with a bloom. Leaflets usually 2 pairs; tendrils branching; stipules large, ovate, rather heart-shaped at the base. Peduncle several-flowered. Flowers white, bluish, reddish, or variegated. Pods large; seeds globular or somewhat flattened and wrinkled. There are many varieties, differing greatly in size, of the plant and of the fruit. Cultivated from Europe (?).

47. GERANIACEÆ. GERANIUM FAMILY.

Herbs or small shrubs. Leaves simple, usually with glandular hairs which secrete an aromatic oil. Flowers perfect,

axillary and solitary or clustered, regular or slightly irregular hypogynous, their parts in fives. Stamens 5 or 10, monadelphous at the base. Carpels 5, each 2-ovuled, splitting away with their long styles when ripe from a central axis and thus scattering the seeds.

I. GERANIUM, Tourn.

Herbs, rarely shrubs. Leaves with stipules, opposite or alternate, usually cut or lobed. Flowers regular, on 1–2-flowered axillary peduncles. Sepals and petals 5. Stamens 10, ripening in 2 sets. Ovary 5-lobed, 5-beaked; stigmas 5.

1. **G. maculatum, L.** WILD CRANESBILL, WILD GERANIUM. Perennial, with an erect, hairy stem, 12–18 in. high. Leaves about 5-parted, marked with pale blotches, the root-leaves long-petioled. Flowers large (1 in. or more in diameter), light purple, somewhat corymbed. Petals entire, twice as long as the calyx, the claw bearded. Open woods and thickets; common.

2. **G. robertianum.** HERB ROBERT. Annual or biennial. Stems somewhat hairy, weak and spreading, reddish. Leaves of 5 leaflets, the latter once or twice pinnately cut, long-petioled. Flowers light purple, about ½ in. in diameter, streaked with dark and light red. Claws of petals smooth. Damp woods and ravines E.

II. PELARGONIUM, L'Her.

Perennial herbs or shrubs. Leaves with stipules, scented. Flowers much as in the preceding genus, but one of the sepals hollowed out below into a nectar-bearing tube extending down the pedicel. The 2 upper petals different in size or shape from the other 3. Cultivated from the Cape of Good Hope. [Most of the species are commonly, though not quite correctly, called "geraniums." Only a few of the commonest are here described.]

1. **P. peltatum, Ait.** IVY GERANIUM. Stems somewhat prostrate and trailing. Leaves somewhat peltate, smooth or nearly so. Flowers pink or white.

2. **P. zonale, Willd.** HORSESHOE GERANIUM. Stem erect, widely branched, woody below. Leaves alternate, opposite or sometimes in 3's, round or kidney-shaped, palmately veined, crenate,

downy, usually with a dark zone near the middle. Flowers in a long peduncled umbel, showy, red or white, often double. Numberless varieties in cultivation.

3. **P. graveolens, Ait.** ROSE GERANIUM. Stem erect or ascending, densely downy, 1–3 ft. high. Leaves alternate, palmately lobed or divided, the lobes often finely dissected, rolled under at the edges. Flowers umbelled, small, light purple with darker veins; whole plant very fragrant. Common in cultivation.

4. **P. odoratissimum, Ait.** NUTMEG GERANIUM. Branches crooked and straggling from a very short, moderately stout main stem. Leaves small, roundish and scalloped, covered with velvety down, very fragrant. Flowers white, inconspicuous, on short pedicels, the petals hardly longer than the calyx.

48. OXALIDACEÆ. WOOD-SORREL FAMILY.

Herbs or woody plants. Leaves compound. Flowers in fives, perfect, regular, hypogynous. Stamens 10, somewhat monadelphous at the base. Ovary with several ovules in each cell. Fruit a capsule.

OXALIS, L.

Acid herbs. Leaves radical or alternate, with or without stipules, usually of 3 leaflets, which droop at night. Sepals 5. Petals 5. Stamens 10. Ovary 5-lobed, 5-celled; styles 5.

1. **O. Acetosella, L.** WOOD-SORREL. Stemless, from a creeping, scaly rootstock. Leaves all radical, long-petioled, of 3 inversely heart-shaped leaflets; scape slender, 2–5 in. high, 1-flowered. Flowers nearly 1 in. in diameter, white, veined with red or purple. Cold woods N.

2. **O. violacea, L.** VIOLET WOOD-SORREL. Perennial from a bulbous root, stemless. Leaves long-petioled; leaflets inversely heart-shaped, sometimes slightly downy, often with a dark zone near the middle. Scapes usually longer than the petioles, umbellately 4–10-flowered; pedicels slender. Flowers violet-purple, nodding. Petals obtuse, 2–3 times as long as the sepals; scapes and petioles 4–5 in. long. Common in rich woods.*

[The forms with small yellow flowers, hitherto referred to *O. corniculata*, belong to several nearly related species too difficult for the beginner.]

49. TROPÆOLACEÆ. Indian Cress Family.

Smooth and tender herbaceous plants, with biting juice, often climbing by the petioles of their simple leaves. Leaves alternate, without stipules. Peduncles axillary, 1-flowered. Sepals 3–5, the upper one with a long, distinct spur. Petals 1–5, hypogynous, not always all alike. Stamens 6–10, perigynous, distinct. Ovary 1, 3-cornered, made up of 3–5 1-ovuled carpels; style 1; stigmas 3–5. Fruit not opening.

TROPÆOLUM, L.

Characteristics of the genus those of the family above given, together with the following:

Petals usually 5, clawed, the 2 upper inserted at the mouth of the spur and unlike the 3 lower ones. Stamens 8, ripening unequally, the filaments curved. Fruit 3-celled, 3-seeded. Cultivated from S. A. for the very showy flowers and the sharp-flavored fruits, which are often pickled.

1. **T. majus, L.** Common Nasturtium. Climbing by the petioles 6–8 ft. (there is also a low variety which does not climb). Leaves roundish but more or less 6-angled, peltate, with the petiole attached near the middle. Flowers varying from almost white to nearly black, but commonly crimson, scarlet, or flame-color.

50. LINACEÆ. Flax Family.

Herbs, shrubs, or trees. Leaves usually alternate, simple, entire, sometimes with stipules. Flowers variously clustered. Sepals 5, distinct or coherent. Petals 5, hypogynous. Stamens 5, monadelphous below. Pod 8–10-seeded, with twice as many cells as there are styles.

LINUM, Tourn.

Herbs or small shrubs, with tough, fibrous bark. Leaves sessile. Flowers in corymbs or panicles. Sepals 5, entire. Petals 5, distinct or coherent below, falling in a few hours after expanding.

1. **L. virginianum, L.** WILD FLAX. Stem rather slender, erect and cylindrical; branches cylindrical. Leaves small, varying from oblong to lanceolate or spatulate, the lower often opposite. Flowers small, yellow. Capsules flattened at right angles to the pedicels. Dry woods and pastures.

2. **L. usitatissimum, L.** COMMON FLAX. Stem erect, with corymbed branches at the top. Leaves narrowly lanceolate. Flowers handsome, large, blue. Cultivated for the fiber. From Europe; introduced here to some extent.

51. RUTACEÆ. RUE FAMILY.

Shrubs or trees. Leaves alternate, compound, without stipules, marked with translucent dots. Flowers perfect or variously imperfect. Sepals and petals 3–5 or none; petals hypogynous or perigynous when present. Stamens as many or twice as many as the sepals, inserted on the glandular disk. Pistils 2–5, often partially united. Fruit a capsule, a key-fruit, or in the important genus Citrus (orange, lemon, lime, etc., not here described) a leathery-skinned berry, the outer part of the skin containing many spherical oil-cavities.*

I. XANTHOXYLUM, L.

Trees or shrubs; bark, twigs, and petioles usually prickly; leaves odd-pinnate, marked with translucent dots. Flowers in axillary or terminal cymes or umbels, monœcious or dioœcious. Sepals and petals 3–5 or none. Stamens 3–5, hypogynous. Pistils 2–5, distinct. Carpels 2-valved, 1–2-seeded. Seeds smooth and shining.*

1. **X. americanum, Mill.** NORTHERN PRICKLY ASH, TOOTHACHE-TREE. A prickly shrub, 8–12 ft. high, with aromatic bark. Leaves pinnately compound; leaflets ovate-oblong. Flowers small and greenish, in axillary umbels, appearing before the leaves. Petals 4–5. Pistils 3–5, the styles slender. Pods rather globose, somewhat more than $\frac{1}{8}$ in. in diameter, roughish, borne on a short stalk above the receptacle, with a strong scent of lemon and tasting at first aromatic, then burning. Rocky woods, ravines, and river banks.

II. PTELEA, L.

Shrubs with smooth and bitter bark. Leaves with 3 leaflets. Flowers in terminal cymes, somewhat monœcious. Sepals 3–6, deciduous, much shorter than the petals. Stamens 4–5, longer than the petals and alternate with them. Pistillate flowers producing imperfect stamens. Ovary compressed, 2-celled. Fruit a 2-celled, 2-seeded, broadly winged key.*

1. **P. trifoliata, L.** HOP-TREE, WAFER ASH. A shrub 4–8 ft. high. Leaves long-petioled; leaflets oval or ovate, acute, obscurely serrate, the lateral ones oblique. Cymes compound. Flowers greenish. Stamens mostly 4, filaments bearded, key about 1 in. in diameter; wing notched, strongly netted-veined. Rocky banks; often cultivated.*

52. POLYGALACEÆ. POLYGALA FAMILY.

Herbs or shrubs. Leaves alternate or nearly opposite, without stipules, simple. Flowers irregular. Sepals unequal, the 2 inner wing-shaped and petal-like. Petals 3–5, hypogynous, the 2 lateral ones often united with the hooded lower one into a tube, split open at the base behind. Stamens 8, filaments united into a split sheath, which is usually adnate to the petals; anthers usually opening by pores. Ovary 2-celled, 2-ovuled. [A difficult family for the beginner.]

POLYGALA, Tourn.

Herbs or shrubs. Flowers racemed or spiked, some of them often cleistogamous. Petals adnate below to the stamen-sheath. Anthers opening by transverse pores.

1. **P. paucifolia, Willd.** FRINGED POLYGALA, BABIES' TOES, MAY WINGS. A low perennial herb, with branches 3–4 in. high from a slender, creeping rootstock. Lower leaves scattered, small and scale-like, the upper ones with petioles, crowded near the tips of the branches, ovate or nearly so. Flowers of two kinds, the cleistogamous whitish, fertile, borne underground along the rootstock, the terminal flowers large and showy (nearly an inch long), rose-purple, with a beautiful fringed crest. Woods, especially N. and E.

2. **P. Senega, L.** SENECA SNAKEROOT. A perennial herb, with several erect stems arising from stout, hard, knotty rootstocks. Leaves lanceolate, oblong or lance-ovate, sessile. Flowers all alike, small, white, in solitary close spikes. Rocky woods.

53. EUPHORBIACEÆ. SPURGE FAMILY.

Herbs, shrubs, or trees, usually with a milky, more or less acrid and sometimes poisonous juice. Flowers mostly apetalous, monœcious or dicœcious (Fig. 16). Ovary usually 3-celled, with 1 or 2 ovules in each cell; stigmas as many as the

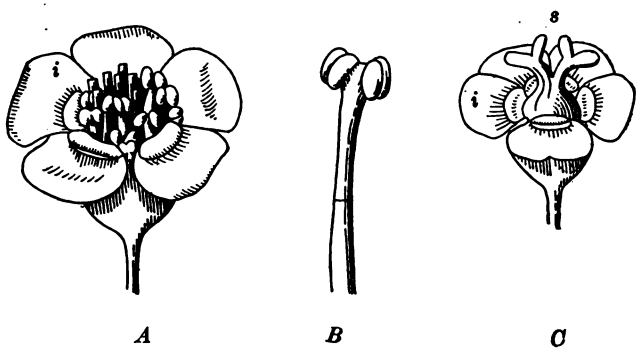


FIG. 16.—*Euphorbia corollata.*

A, flower-cluster with involucre, the whole appearing like a single flower; *B*, a single staminate flower; *C*, immature fertile flower, as seen after the removal of the sterile flowers; *i*, involucre; *s*, stigmas.

cells or twice as many. Fruit a 3-lobed capsule. Seeds containing fleshy or oily endosperm (Part I, Fig. 2). Most of the family are natives of hot regions, many of them of peculiar aspect from their adaptation to life in dry climates. [The family is too difficult for the beginner in botany to determine many of its genera and species with certainty, but a few are described below.]

I. EUPHORBIA, L.

Herbs or shrubs, with milky juice, often poisonous. Flowers monœcious, enclosed in a 4–5-lobed involucre, which is often showy and resembles a calyx or corolla, usually bearing large glands at its notches. Sterile flowers many, borne inside the involucre at its base (Fig. 16, *A*), each consisting only of a single stamen attached by a joint to a pedicel which looks like a filament. Fertile flower standing alone at the center of the involucre (Fig.16, *C*) (soon pushed out by the growth of its pedicel), consisting only of a 3-lobed and 3-celled ovary, 3 2-cleft styles, and 6 stigmas. Pod 3-celled and 3-seeded.

A. *Cultivated shrubs.*

1. **E. splendens, Bojer.** CROWN OF THORNS. An extremely prickly shrub, with many erect, few-leaved branches. Leaves obovate or obovate-spatulate, mucronate, entire, each with two very sharp prickles (longer than the petiole) as stipules. Peduncles long, sticky, each bearing 2–4 objects, which appear to be showy scarlet flowers, but which are actually 2-bracted involucres containing the true flowers. Involucral scales somewhat kidney-shaped, mucronate. Flowering all the year round. Cultivated in greenhouses. From Mauritius.

B. *Herbs with rather showy white flower-clusters.*

2. **E. corollata, L.** FLOWERING SPURGE. Perennial. Stem erect, umbellately branched above, smooth or downy, 1–3 ft. high. Leaves of the stem alternate, those of the branches usually opposite or whorled, rather thick, oval to narrowly oblong, pale beneath, usually slightly downy. Flowering branches repeatedly forked; involucres terminal and in the forks of the branches, peduncled; glands 4–5, oblong, green; appendages white and petal-like, showy. Capsule erect, seed smooth or faintly pitted. Common in dry, open woods.

C. *Herbs: No. 3 a native species, No. 4 cultivated from Europe or escaping from gardens. Flower-clusters in umbels not white. Involucre 4 or 5 lobed, each lobe with a gland.*

3. **E. dictyosperma, Fischer and Mayer.** Annual. Stem slender, 8–18 in. high, erect. Stem-leaves oblong-spatulate to obovate, serrate; floral ones roundish-ovate, somewhat heart-shaped. Flower-cluster a compound umbel, the rays once or twice 3-forked, then 2-forked. Seeds covered with a network. Prairies and roadsides.

4. **E. Cyparissias, L.** CYPRESS SPURGE, CYPRESS, GRAVEYARD MOSS. A perennial, in dense clusters 6–12 in. high from running rootstocks. Leaves much crowded, all sessile, the stem-leaves linear, floral ones broadly heart-shaped. Flower-cluster a simple, many-rayed umbel. Glands crescent-shaped. Cemeteries, roadsides, etc., escaped from cultivation; also cultivated in old gardens. From Europe.

II. JATROPHA, L.

Shrubs or herbs. Leaves alternate. Flowers monœcious, staminate and pistillate intermixed in the cymes, apetalous. Calyx large, white, 5-lobed, corolla-like. Stamens numerous, usually monadelphous. Ovary usually 3-celled, 3-seeded; styles 3, united at the base, several-parted.*

1. **J. stimulosa, Michx.** SPURGE NETTLE. Perennial herbs armed with stinging hairs; stems erect, branched, bright green with white lines, 8–15 in. high. Leaves long-petioled, deeply palmately 3–5-lobed, the lobes irregularly cut and toothed, often mottled. Sepals white, spreading. Seeds oblong, smooth, mottled. In dry woods S.*

54. ANACARDIACEÆ. SUMAC FAMILY.

Trees or shrubs, with resinous, acrid, or milky sap. Leaves simple, of 3 leaflets or pinnately compound, alternate, without stipules. Flowers perfect or imperfect, small. Calyx 3–5-parted, persistent. Petals 3–5 or wanting. Stamens as many as the sepals or sometimes twice as many, inserted in the base of the calyx, distinct. Ovary free, 1-celled, styles 1–3. Fruit a 1-seeded stone-fruit.*

RHUS, L.

Trees or shrubs. Leaves of 3 leaflets or odd-pinnate. Flowers in spikes or panicles. Calyx mostly 5-parted. Petals and stamens 5. Pistil 1, sessile; styles 3, terminal. Fruit small, smooth or downy.*

1. **R. glabra, L.** SUMAC. A shrub or small tree, sometimes 25–30 ft. high; branches downy. Leaves odd-pinnate, main midrib downy and wing-margined; leaflets 9–21, ovate-lanceolate, acute at the apex, inequilateral, entire or slightly toothed, smooth and green

above, pale and downy beneath. Panicle often large and spreading; flowers somewhat monœcious. Fruit red, hairy, acid. Open woods.*

2. **R. typhina, L.** STAGHORN SUMAC. A small tree, 20–40 ft. high; branches and petioles closely velvety-hairy. Leaves odd-pinnate, leaflets 17–27, lanceolate-oblong, taper-pointed at the apex, very obtuse at the base, sharply serrate, smooth above, pale and downy beneath. Flowers somewhat monœcious, in dense terminal panicles. Fruit red, with crimson hairs. Dry hillsides N. and E.*

3. **R. Toxicodendron, L.** POISON VINE, POISON IVY, MERCURY, BLACK MERCURY. Stem a woody vine climbing high by aerial rootlets, or sometimes short and erect. Leaves petioled, of 3 leaflets, downy; leaflets ovate or oval, taper-pointed, entire or somewhat dentate, often angled or lobed. Flowers dicœcious, in loose axillary panicles. Fruit nearly white, smooth. Common in open woods and along fences. Plant poisonous to the touch.*

4. **R. venenata, L.** POISON SUMAC, POISON DOGWOOD. A very smooth shrub with gray bark, 6–18 ft. high. Leaves large and glossy, with 7–13 obovate-oblong, entire leaflets. Flower-clusters loosely-flowered, axillary panicles. Fruit smooth, greenish-yellow. Swamps and wet openings in woods N. and E. Plant more poisonous than the preceding species.

55. AQUIFOLIACEÆ. HOLLY FAMILY.

Trees or shrubs. Leaves simple, alternate, petioled; stipules small or wanting. Flowers small, greenish, clustered or solitary in the axils, usually dicœcious. Calyx 4–9-parted. Petals 4–9, somewhat united at the base. Stamens inserted in the tube of the corolla and alternate with its lobes. Ovary free, 4–9-celled, with a single ovule in each cell. Fruit a berry-like stone-fruit, 4–9-seeded.*

ILEX, L.

Small trees or shrubs. Leaves usually leathery, often persistent and evergreen; stipules minute. Flowers axillary, 4–9-parted, the fertile often solitary and the staminate clustered. Fruit a stone-fruit with 4–9 nutlets.*

1. **I. opaca, Ait.** HOLLY. Trees with smooth, light-colored bark, and hard, very white wood; young twigs downy. Leaves leathery, oval or ovate, margin prickly-toothed, dark green and shining

above, paler and sometimes slightly downy beneath. Peduncles short, bracted. Flowers 4-parted, staminate flowers in small cymes, the pistillate usually solitary. Fruit bright red. Damp, sandy soil E. and S.*

2. **I. decidua, Walt.** DECIDUOUS HOLLY. Small trees; twigs smooth. Leaves thin, obovate, obtuse or sometimes acute at the apex, scalloped, smooth, deciduous. Flowers in sessile clusters, 4–6 parted. Fruits very numerous, bright red. On low ground S.*

3. **I. verticillata, Gray.** BLACK ALDER, WINTERBERRY. A much-branched shrub 6–8 ft. high. Leaves thin, oval or obovate, taper-pointed, serrate, 1½–2 in. long. Flowers greenish-white, on very short peduncles. Fruit bright red, 1, 2, or 3 in a leaf-axil, remaining long after the leaves have fallen. Swampy ground and damp woods and thickets.

56. CELASTRACEÆ. STAFF-TREE FAMILY.

Trees or shrubs, sometimes climbing. Leaves simple, opposite or alternate. Flowers small, in cymes. Calyx small, 4–5-lobed, persistent. Petals 4–6, short. Stamens 4–6, alternate with the petals and inserted with them on a disk. Ovary sessile, 3–5-celled; style entire or 3–5-cleft; ovules 2 in each cell. Seeds usually covered with an appendage (aril) growing from the hilum.

I. CELASTRUS, L.

A woody, twining shrub. Leaves alternate. Flowers dicœcious or somewhat monœcious, small, greenish, clustered at the ends of the branches. Pod 3-celled, 3-valved, looking like an orange-colored berry, which on opening shows the scarlet arils of the seeds.

1. **C. scandens, L.** WAX-WORK, CLIMBING BITTERSWEET. Climbing 10–15 ft. Leaves ovate-oblong, 2–4 in. long, finely serrate, taper-pointed. In thickets and along fences, also planted for the showy scarlet seeds, which retain their color for many months.

II. EUONYMUS, Tourn.

Shrubs with 4-angled branches. Leaves opposite. Flowers in axillary, peduncled cymes, purplish or greenish, small.

Sepals and petals 4–5, spreading. Stamens as many as the petals, short. Ovary 3–5-celled, with 2 ovules in each cell. Seeds enclosed in a red, fleshy pulp.*

1. **E. americanus, L.** STRAWBERRY BUSH. A shrub 3–8 ft. high. Leaves short-petioled, ovate to ovate-lanceolate, acute or taper-pointed at the apex, finely serrulate, smooth or slightly hairy. Peduncles axillary, slender, 1–3-flowered. Flowers greenish. Capsule 3–5-angled, warty. In low, shady woods.

2. **E. atropurpureus, Jacq.** WAHOO. A tree-like shrub 10–15 ft. high. Leaves oval to ovate, taper-pointed, finely serrulate, minutely downy petioles $\frac{1}{2}$–$\frac{3}{4}$ in. long. Peduncles slender, 3-forked, several-flowered. Flower purplish; capsule deeply 3–5-lobed, smooth. River banks.

57. STAPHYLEACEÆ. BLADDER-NUT FAMILY.

Shrubs. Leaves pinnately compound, with stipules, and the leaflets with little individual stipules (stipels). Flowers regular and perfect. Calyx-lobes 5. Petals 5, inserted in or around a saucer-shaped disk. Stamens 5, alternate with the petals, perigynous. Ovary 2–3-celled, with the carpels more or less distinct; ovules several; styles 2–3, cohering somewhat below. Fruit usually 1–few-seeded.

STAPHYLEA, L.

Calyx deeply 5-parted, the lobes appearing like separate sepals, erect. Petals spatulate, borne on the rim of the thick disk. Pod large, papery, 3-celled, finally opening at the top. Seeds 1–4 in each cell, bony.

1. **S. trifolia, L.** AMERICAN BLADDER-NUT. A shrub 6–12 ft. high, with smooth, slender, greenish striped, at length gray, branches. Leaves long-petioled, with 3 ovate, taper-pointed, finely serrate leaflets. Damp thickets.

58. ACERACEÆ. MAPLE FAMILY.

Trees or shrubs, with abundant, often sugary sap. Leaves opposite, simple and palmately lobed, or pinnate, without

stipules. Flowers regular, mostly somewhat monœcious or dioœcious, in axillary and terminal cymes or racemes. Calyx 4–9-parted. Petals as many as the lobes of the calyx or none. Stamens 4–12, hypogynous. Ovary 2-celled; styles 2. Fruit a double key.*

ACER, Tourn.

Characteristics of the genus as above given for the family.

1. **A. saccharinum, L. (A. dasycarpum, Ehrh.).** WHITE MAPLE, RIVER MAPLE. A tall tree with the main branches slender and rather erect. Leaves very deeply 5-lobed, with the notches rather acute, silvery-white, and when young downy on the lower surface, the divisions narrow, coarsely cut and toothed. Flowers greenish, in umbel-like clusters, appearing long before the leaves. Petals absent. Fruit woolly at first, then smooth, with diverging wings, the whole 2–3 in. long. Common on river banks S. and W., also planted for a shade-tree, but not safe, as the branches are easily broken off by the wind.

2. **A. rubrum, L.** RED MAPLE. A small tree with red or purple twigs. Leaves simple, broadly ovate, palmately 3–5-lobed or sometimes merely serrate or cut-toothed, taper-pointed at the apex, rounded or heart-shaped at the base, smooth or downy, becoming bright red in autumn. Flowers appearing before the leaves on erect, clustered pedicels. Petals red or yellow, oblong or linear. Fruiting pedicels elongated, and drooping. Key red, smooth, wings about an inch long. Swamps and river banks E.*

3. **A. saccharum, Marsh (A. saccharinum, Wang.).** SUGAR MAPLE. A large tree. Leaves simple, palmately lobed, truncate or heart-shaped at the base, lobes sinuate-toothed and acuminate, pale and slightly downy beneath. Flowers appearing with the leaves, on clustered drooping pedicels. Calyx bell-shaped, fringed. Petals none. Keys smooth, wings about 1–1½ in. long. In cold woods, more abundant northward. The sap of this tree is the principal source of maple sugar, and some forms of the tree produce the curled maple and bird's-eye maple used in cabinet-making.*

4. **A. Pseudo-Platanus, L.** SYCAMORE MAPLE. Easily recognized by its drooping clusters of rather large green flowers, which appear with the leaves. Cultivated from Europe.

5. **A. platanoides, L.** NORWAY MAPLE. A large tree, with milky sap, which exudes from broken shoots or leafstalks in the spring. Cultivated from Europe; a very desirable shade-tree.

6. **A. Negundo, L.** BOX ELDER. A small tree. Leaves opposite,

pinnately 3–5-foliate; leaflets ovate, lobed, toothed or entire, downy when young. Flowers dicœcious, appearing from lateral buds before or with the leaves; the staminate on long and drooping pedicels, the pistillate in drooping racemes. Keys smooth, 1–1½ in. long. River banks. Often cultivated as a quick-growing shade-tree.*

59. HIPPOCASTANACEÆ. Buckeye Family.

Trees or shrubs. Leaves opposite, long-petioled, palmately compound. Flowers showy, somewhat monœcious, in terminal panicles. Calyx 5-lobed, oblique. Petals 4–5, unequal. Stamens 5–8, hypogynous. Pistil 1; ovary 3-celled, 2 ovules in each cell; style slender. Fruit a 1–3-celled, leathery capsule, 1–3-seeded. Seeds with a large scar.*

ÆSCULUS, L.

Characteristics of the genus as above given for the family.

1. **Æ. Hippocastanum, L.** Horse-chestnut. A round-topped tree with frequently forking branches and stumpy twigs. Leaves very large, with 7 straight-veined leaflets. Flowers large and showy. Corolla open and spreading, of 5 white petals, spotted with purple and yellow. Stamens with long, curved filaments. Fruit large, covered with stout, soft prickles when young. Cultivated from Asia.

2. **Æ. glabra, Willd.** Ohio Buckeye. A large tree, not unlike a horse-chestnut. Leaflets generally 5. Flowers small. Corolla of 4 upright, pale yellow petals. Stamens curved, about twice as long as the petals. Fruit prickly at first. River banks.

3. **Æ. flava, Ait.** Sweet Buckeye. Varying in size from a low shrub to a tall tree. Leaves with 5–7 leaflets. Flowers in a short, dense panicle. Petals 4, in 2 unlike pairs, bending inward, blades of the longer pair very small. Fruit not prickly. Woods W. and S.

4. **Æ. Pavia, L.** Red Buckeye. Shrubs; stems erect, branched, 4–8 ft. high. Leaflets usually 5, lanceolate to narrowly oval, taper-pointed at both ends, finely serrate, smooth or nearly so. Flowers in dense, erect panicles, bright red. Stamens rather longer than the petals. Fruit nearly smooth. Common in open woods.*

60. BALSAMINACEÆ. Balsam Family.

Tender, fleshy-stemmed, annual herbs. Leaves simple, without stipules. Flowers perfect, irregular. Sepals usually 3, the largest one with a spur. Petals 3. Stamens 5, distinct or nearly so. Ovary 5-celled, bursting when ripe into 5 valves.

IMPATIENS, L.

Characteristics of the genus those above given for the family. Fruit a capsule (very fleshy in our species), which when ripe bursts open with considerable force, throwing the seeds about.

1. **I. aurea, Muhl. (I. pallida, Nutt.).** Wild Balsam. Lady's-slipper. Stem 3–5 ft. high, branching. Leaves oblong-ovate, 2–6 in. long, the lower often long-petioled, the upper nearly sessile. Peduncles axillary, 1–3 in. long, slender, 2–5 flowered. Flowers pale yellow, slightly dotted with brownish-red. Sac of the large sepal broader than it is long, ending in a recurved spur about ¼ in. long. Damp, shaded ground, not very common.

2. **I. biflora, Walt. (I. fulva, Nutt.).** Wild Balsam, Lady's-slipper, Jewel Weed, Snap Weed, Kicking Colt. Stem 2–4 ft. high, branching. Leaves rhombic-ovate, 1–4 in. long. Peduncles about 1 in. long, generally 2–3-flowered. Flowers orange-color, with many pretty, large, reddish-brown spots. Sac longer than it is broad, ending in a recurved spur about ½ in. long. Damp, shaded ground, commoner than No. 1 and usually blossoming earlier.

61. RHAMNACEÆ. Buckthorn Family.

Trees or shrubs. Leaves simple, often 3–5-nerved; stipules small. Flowers small, sometimes imperfect, green or yellow. Calyx 4–5-lobed. Petals 4, 5, or absent, inserted on a disk at the throat of the calyx, very small, hooded, usually with claws. Stamens 4–5, inserted with the petals and opposite them, often enclosed by the petals; filaments awl-shaped; anthers small, versatile. Ovary 3-celled, 3-ovuled.

I. BERCHEMIA, Necker.

Shrubs; stems twining or erect. Leaves alternate, prominently pinnate-veined, stipules minute. Flowers in axillary or terminal panicles, or rarely solitary. Calyx-tube hemispherical, 5-lobed. Petals 5, sessile, concave, as long as the calyx. Ovary 2-celled, half-inferior; stigmas 2. Fruit an oval, 2-seeded stone-fruit.*

1. **B. volubilis, DC.** SUPPLE-JACK, RATTAN-VINE. Woody, often twining high; older bark yellowish, twigs purple, wood very tough. Leaves ovate or oval, acute or obtuse, cuspidate at the apex, rounded at the base, wavy on the margins, green above, pale beneath. Flowers in small panicles. Fruit purple. In moist woods and along streams S.*

II. RHAMNUS, L.

Leaves alternate, deciduous. Flowers in small, axillary cymes, often imperfect. Petals 4–5 or wanting. Stamens 4 or 5, very short. Stone-fruit, 2–4-seeded.

1. **R. lanceolata, Pursh.** A tall shrub. Leaves with short petioles, taper-pointed or somewhat obtuse, very variable in size, smooth or nearly so above, more or less downy beneath, finely serrate. Flowers 2 or 3 together in the axils, greenish, about $\frac{1}{8}$ in. in diameter, usually dicœcious, appearing at the same time as the leaves. Calyx 4-lobed. Petals 4. Stamens 4. Fruit black, about $\frac{1}{4}$ in. in diameter. Hills and river banks.

2. **R. caroliniana, Walt.** CAROLINA BUCKTHORN. A small tree with black bark and very hard wood; twigs finely downy. Leaves alternate, prominently veined, elliptical to broadly oval, entire or obscurely serrate, smooth or sometimes downy below; petioles slender, downy. Flowers in axillary, peduncled umbels; petals minute. Fruit globose, $\frac{1}{3}$–$\frac{1}{2}$ in. in diameter, 3-seeded. Seeds smooth. On river banks.*

III. CEANOTHUS, L.

Shrubs. Leaves alternate, petioled. Flowers perfect, in terminal panicles or corymbs formed of little umbel-like clusters. Calyx-tube top-shaped or hemispherical, with a 5-lobed border. Petals 5, with hoods, on slender claws. Stamens 5, filaments long and thread-like. Fruit dry, 3-lobed, splitting when ripe into 3 carpels.

1. **C. americanus, L.** New Jersey Tea, Red Root. Shrub, with many branching stems, 1–3 ft. high, from a deep red root. Leaves 1–3 in. long, ovate or nearly so, acute or taper-pointed at the tip, obtuse or somewhat heart-shaped at the base, downy beneath, serrate, 3-nerved. Flowers small, white.

62. VITACEÆ. Vine Family.

Shrubs, with the stem swollen at the insertion of the petioles and climbing by tendrils borne opposite the leaves. Leaves alternate, with stipules simple or compound. Flowers small, greenish, generally in clusters, borne in similar positions to the tendrils, hypogynous or nearly so. Sepals, petals, and stamens 4–5. Carpels 2, each 2-ovuled. Calyx very small. Corolla deciduous, the petals often hooded. Stamens opposite the petals. A disk inside the calyx bears nectar and its lobes alternate with the stamens. Fruit a berry.

I. VITIS, Tourn.

Climbing woody vines; stems with tumid joints, climbing by tendrils opposite some of the leaves. Leaves simple, palmately veined or lobed; stipules small, soon deciduous. Flowers mostly somewhat monœcious or dioœcious. Petals often united at the apex and not expanding. Stamens inserted between the lobes of the disk. Ovary usually 2-celled, 4-ovuled. Fruit juicy, 1–4-seeded.*

1. **V. labrusca, L.** Fox Grape. Stems climbing high, often 1 ft. or more in diameter; bark shreddy, coming off in long strips, young branches woolly. Leaves broadly heart-shaped, more or less deeply 3–5-lobed, mucronate-dentate, very woolly when young, becoming smooth above. Panicles of pistillate flowers compact, of staminate flowers looser. Fruit about ½ in. in diameter, dark purple or sometimes nearly white. In rich woods E., S., and SW. Many of the cultivated varieties, Concord, Niagara, etc., have been developed from this species.*

2. **V. æstivalis, Michx.** Summer Grape. Stem climbing high; bark shreddy. Leaves broadly heart-shaped, 3–5-lobed, the lobes dentate, notches rounded, white-woolly when young, often nearly smooth when old; tendrils or panicles opposite 2 out of every 3

leaves, panicles long and slender. Fruit dark blue, small, very acid. In rich woods E. and S.*

3. **V. cordifolia, Michx.** FROST GRAPE, CHICKEN GRAPE. Leaves rather smooth, thin, and shining, either not lobed or somewhat 3-lobed, heart-shaped, with the notch at the base deep and acute, taper-pointed, with large, sharp teeth. Flower-clusters large and loose. Grapes shining black, very sour, not ripening until after frosts; seeds 1 or 2, rather large. Moist thickets and banks of streams S.

4. **V. rotundifolia, Michx.** MUSCADINE GRAPE. Stem climbing high; joints short; bark not shreddy; wood very hard, often producing long, aerial roots. Leaves orbicular, heart-shaped at the base, coarsely toothed, nearly or quite smooth. Panicle small. Grapes few in a cluster, large. The original form of the Scuppernong grape S.*

II. AMPELOPSIS, Michx.

Woody vines, climbing by tendrils and rootlets. Leaves palmately compound. Flowers in compound cymes, perfect or somewhat monœcious. Petals 5, distinct, spreading; disk none. Stamens 5. Ovary 2-celled, 4-ovuled. Fruit a 1–4-seeded berry, not edible.*

1. **A. quinquefolia, Michx.** VIRGINIA CREEPER. WOODBINE. Stem usually climbing high, but sometimes short and prostrate, often producing many adventitious aerial roots which assist the vine in holding to a support; tendrils usually terminating in flat, adhesive disks. Leaves palmately compound, of 5 oval leaflets, coarsely and unevenly toothed above, usually entire below, smooth or slightly downy. Cymes large and spreading when mature; pedicels red. Berries small, dark blue. Common in rich woods.*

2. **A. tricuspidata, Sieb. and Zucc.** JAPANESE IVY, BOSTON IVY. A freely branching, hardy climber. Tendrils numerous, branching with closely adhesive disks. Leaves occasionally with 3 leaflets, but usually with only one, which is jointed with the main petiole and in autumn falls before the petiole; leaflet 3-lobed or only scalloped, roundish-ovate or heart-shaped, rather thick and shining. Cultivated from Japan.

63. TILIACEÆ. LINDEN FAMILY.

Trees or shrubs, rarely herbs. Leaves alternate, with stipules. Flowers perfect in cymes, the latter usually in

corymbs or panicles. Sepals 5. Petals 5 or fewer or wanting. Stamens many, inserted on a swollen disk. Ovary 2–10-celled, with 1 or more ovules in each cell. Fruit 1–12-celled, dry or berry-like.

TILIA, Tourn.

Trees with rough gray bark on the trunk; bark of the twigs smooth, lead-colored; wood white and soft. Leaves cordate, usually inequilateral. Cymes axillary or terminal, peduncles adnate to a large, prominently veined leaf-like bract. Flowers yellowish-white. Sepals 5. Petals 5. Stamens many, in 5 groups. Ovary 5-celled, with 2 ovules in each cell; stigma 5-lobed. Capsule 1-celled, 1–2-seeded; peduncle and bract deciduous with the matured fruit, the bract forming a wing by which the fruit is often carried to a considerable distance.*

1. **T. pubescens, Ait.** BASSWOOD. A tree of medium size; leaves ovate, acuminate at the apex, obtuse and oblique at the base, mucronate-serrate, woolly on both sides or smooth above when old; flowers fragrant, floral bract 2–3 in. long, usually rounded at the base. Fruit globose, about ¼ in. in diameter. In rich woods. Bees gather large quantities of nectar from the flowers.*

2. **T. americana, L.** BASSWOOD, WHITEWOOD. A large tree, sometimes 125 ft. high. Leaves larger than in No. 1 (2–5 in. wide), often unsymmetrical, heart-shaped or truncate at the base, sharply toothed. Floral bract often narrowed at the base. Fruit somewhat ovoid, ½ in. or more in diameter. Common in rich woods; occurs farther N. than No. 1.

3. **T. europæa, L.** EUROPEAN LINDEN. A good-sized tree. Leaves roundish, obliquely heart-shaped, abruptly taper-pointed, finely toothed. Flowers differing from Nos. 1 and 2 in the absence of petal-like scales at the bases of the stamens. Cultivated from Europe.

64. MALVACEÆ. MALLOW FAMILY.

Herbs or shrubs, with simple, alternate, palmately-veined leaves, with stipules. Flowers regular. Sepals 5, often surrounded by an involucre at the base. Petals 5. Stamens numerous, monadelphous. Pistils several, more or less distinct. Fruit a several-celled capsule or a collection of 1-seeded carpels.

I. MALVA, L.

Calyx 5-cleft, with a small, 3-leaved involucre. Petals obcordate or truncate. Styles many, slender, with stigmas running down the sides. Carpels many, 1-seeded, arranged in a circle and separating from each other, but not opening when ripe.

1. **M. rotundifolia, L.** COMMON MALLOW, CHEESES (from appearance of the unripe fruit). A common biennial or perennial weed, with nearly prostrate stems. Leaves long-petioled, round-kidney-shaped, with crenate margins. Flowers small, whitish, on long peduncles.

2. **M. sylvestris, L.** HIGH MALLOW. Biennial or perennial. Stem erect, 2–3 ft. high. Leaves 5–7 lobed. Flowers purplish, larger than those of the preceding species.

II. ABUTILON, Tourn.

Calyx 5-cleft, the tube often angled. Styles 5–20, with knobbed stigmas. Carpels as many as the styles, arranged in a circle, each 1-celled, 3–6-seeded, and opening when ripe by 2 valves.

1. **A. striatum, Dicks.** TASSEL TREE, FLOWERING MAPLE. A shrub 5–10 ft. high. Leaves maple-like. Flowers showy, solitary, nodding on slender peduncles. Corolla not opening widely, orange, striped with reddish-brown veins. Column of stamens projecting beyond the corolla like a tassel. Cultivated in hothouses. From Brazil.

65. HYPERICACEÆ. ST. JOHNSWORT FAMILY.

Herbs, shrubs, or trees. Leaves opposite, often covered with translucent or dark dots, entire or with glandular teeth, without stipules. Flowers usually in terminal cymes. Sepals 5, rarely 4. Petals as many as the sepals, hypogynous. Stamens usually many, more or less grouped in bundles, anthers versatile. Pod 1-celled, with 2–5 parietal placentæ and the same number of styles, or else 3–7-celled, splitting along the partitions.

HYPERICUM, L.

Herbs, shrubs, or small trees. Leaves sessile, often dotted. Flowers yellow, perfect.

1. **H. perforatum, L.** COMMON ST. JOHNSWORT. Perennial. Stem erect, 1–3 ft. high, 2-ridged, much branched. Leaves linear or oblong, obtuse, with translucent veins and dots. Cymes grouped in corymbs, many-flowered. Flowers 1 in. in diameter. Sepals acute. Petals much longer than the sepals, oblique at the tip and irregularly fringed. A common weed in meadows and pastures E. and N.

2. **H. nudicaule, Walt.** ORANGE-GRASS, PINE-WEED. Low (4–9 in. high), slender annual, with erect, angled or almost winged wiry stem and branches. Leaves minute, awl-shaped scales. Corolla about ¼ in. in diameter, usually closing by or before midday. Sandy banks and roadsides.

66. VIOLACEÆ. VIOLET FAMILY.

Herbs, with simple, alternate leaves, with stipules. Calyx of 5 persistent sepals. Corolla of 5 petals, somewhat irregular, one petal with a spur. Stamens 5, short, the filaments often cohering around the pistil (Fig. 17). Style generally club-shaped, with a one-sided stigma, with an opening leading to its interior. Pod 1-celled, splitting into 3 valves, each bearing a placenta. The seeds are often dispersed by the splitting of the elastic valves (Fig. 17).

VIOLA, Tourn.

Sepals ear-like at the base. Petals somewhat irregular, some of them bearded within, thus affording a foothold for bees, the lowest one with a spur at the base. Stamens not cohering very much, the two lowermost with spurs which reach down into the spur of the lowest petal. Many species bear inconspicuous apetalous flowers later than the showy ordinary ones and produce most of their seed from these closed, self-fertilized flowers. (See Part I, Ch. XXVIII.)

§ 1. *Stemless perennials.*

1. **V. pedata, L.** BIRD-FOOT VIOLET, HORSESHOE VIOLET, SAND VIOLET. Rootstock stout, upright, not scaly. Leaves all palmately 5–9-parted into linear or linear-lanceolate divisions. Flowers showy, about 1 in. broad, pale violet to whitish; petals not bearded.

2. **V. palmata, L.** COMMON BLUE VIOLET. Rootstock stout and scaly. Earlier leaves roundish heart-shaped or kidney-form and crenate, with the sides rolled in at the base when young. The later ones variously cleft or parted. Flowers dark or light blue, sometimes whitish; the lateral petals bearded.

Variety **cucullata, Gray.** COMMON BLUE VIOLET, HOOD-LEAF VIOLET. Later leaves remaining nearly crenate, like the earlier ones, in rich soil becoming very luxuriant.

3. **V. sagittata, Ait.** ARROW-LEAVED VIOLET, SPADE-LEAF VIOLET. Leaves very variable, ranging in shape from oblong-heart-

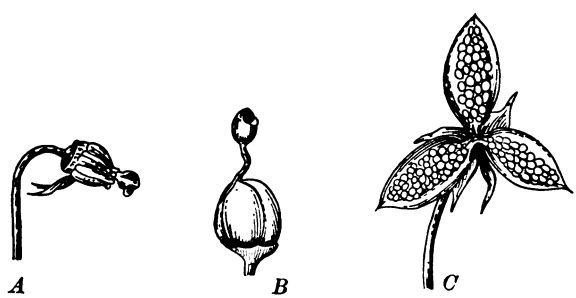


FIG. 17. — *Viola tricolor.*

A, stamens and pistil; *B*, pistil with stamens removed; *C*, pod split open.

shaped to triangular-halberd-shaped, very often with an arrow-shaped base, the earlier ones on short, margined petioles, the later frequently long-petioled. Flowers rather large, otherwise much as in the preceding species. Variable and perhaps an aggregate of several distinct species.

4. **V. blanda, Willd.** SWEET WHITE VIOLET. Rootstock long, slender, and creeping. Leaves roundish heart-shaped or kidney-shaped. Flowers rather small, whitish, sweet-scented, generally beardless, with the lowermost petal exquisitely veined with dark purple lines. In damp or marshy ground.

§ 2. *Leafy-stemmed perennials.*

5. **V. pubescens, Ait.** DOWNY YELLOW VIOLET. Soft, downy, 6–12 in. high. Leaves broadly heart-shaped, toothed, with large stipules. Flowers yellow, with a short spur.

6. **V. canadensis, L.** CANADA VIOLET. Stems very leafy, smooth, 1 ft. or more high. Leaves heart-shaped, taper-pointed, serrate. Flowers large and handsome; petals white, or nearly so, inside, the upper ones usually violet-tinged beneath, lateral petals bearded.

§ 3. *Leafy-stemmed, from an annual, biennial, or occasionally short-lived perennial root; stipules about as large as the leaves.*

7. **V. tricolor, L.** PANSY, HEART'S-EASE. Stem branching, angular, hardly erect. Leaves variable, more or less ovate, crenate. Flowers large (often more than 1 in. across), flattish, short-spurred, exceedingly variable in color. Cultivated from Europe.

Variety **arvensis.** JOHNNY-JUMP-UP, LADY'S-DELIGHT. A small flowered variety. Introduced in gardens and sometimes appearing like a native plant.

67. PASSIFLORACEÆ. PASSION-FLOWER FAMILY.

Shrubs or herbs, climbing by axillary tendrils. Leaves alternate, simple, mostly 3-lobed. Flowers axillary, on jointed peduncles, solitary or few together, perfect, regular, often showy. Calyx-tube 4–5-lobed, persistent. Petals usually 5, inserted on the throat of the calyx-tube, which is fringed with a crown of 1–3 rows of long and slender filaments. Stamens 5, their filaments united, and enclosing the stalk of the ovary. Styles 1–5; ovary with 3–5 parietal placentæ. Seeds numerous, fruit fleshy.

PASSIFLORA, L.

Characters of the family.

1. **P. incarnata, L.** PASSION-FLOWER. Perennial. Stem often 20–30 ft. long, somewhat angled or striate, smooth below, downy above. Leaves broadly heart-shaped, palmately 3–5-lobed, the lobes acute, finely serrate, usually heart-shaped at the base; petiole bearing

2 oval glands near its summit. Flowers 2–3 in. wide, solitary; peduncles 3-bracted, longer than the petioles; calyx-lobes with a small horn-like appendage on the back near the apex, white within. Petals and crown purple and white. Fruit yellow, about the size and shape of a hen's egg, edible. Seeds with a pulpy aril. Common along fence-rows and embankments S.*

2. **P. lutea, L.** YELLOW PASSION-FLOWER. Perennial. Stem slender, smooth, 6–10 ft. long. Leaves broadly heart-shaped, 3-lobed at the summit, entire, often mucronate; stipules small; petioles without glands. Peduncles longer than the leaves, usually in pairs. Flowers greenish-yellow, $\frac{1}{2}$–$\frac{3}{4}$ in. wide. Fruit purple, oval, $\frac{1}{2}$ in. long. Woods and thickets S.*

68. BEGONIACEÆ. BEGONIA FAMILY.

Chiefly perennial herbs or low shrubs, with fleshy or very juicy stems. Leaves alternate, generally heart-shaped at the base, often very unsymmetrical; stipules deciduous. Flowers monœcious, in cymes or other clusters, on axillary peduncles. Stamens many (Fig. 18). Pistillate flowers with the floral envelopes borne on the ovary; ovary 3-angled or 3-winged (Fig. 18), very many-seeded.

BEGONIA, L.

Flowers with the calyx and corolla of the same color, staminate and pistillate ones both occurring in the same cluster. Sepals usually 2. Petals 2 or in the fertile flowers 3 or 4, sometimes wanting. Stamens many in a cluster, with short filaments. Styles of the fertile flowers 3, often with long, twisted stigmas (Fig. 18, *C*). The genus contains a great number of species and varieties, cultivated from tropical or subtropical regions, of which only a few of the commonest are here described.

1. **B. Rex, Putz.** Herb, stemless or nearly so, from a fleshy root-stock. Leaves large, taper-pointed, very unequally heart-shaped, the margin sinuous, often bristly fringed, upper surface wholly silvery or mottled silvery and dark green, lower surface green or reddish or of both colors. Flowers few, large ($1\frac{1}{2}$ to $1\frac{3}{4}$ in. in diameter), varying from yellow to pinkish. Cultivated from the Himalayas; many varieties.

2. B. manicata, Cels. Herb, with a short and fleshy stem. Leaves very unevenly heart-shaped, taper-pointed, the margins bristly fringed and sometimes with very remote teeth, upper surface dark green, lower surface and petioles partly covered with long fringed scales, stipules larger and fringed. Flowers flesh-colored, handsome, in a loose panicle borne on a long peduncle. Cultivated from Mexico.

3. B. coccinea, Hook. Tall, 3–10 ft. high, somewhat shrubby, often with many erect, smooth stems from the same root. Leaves

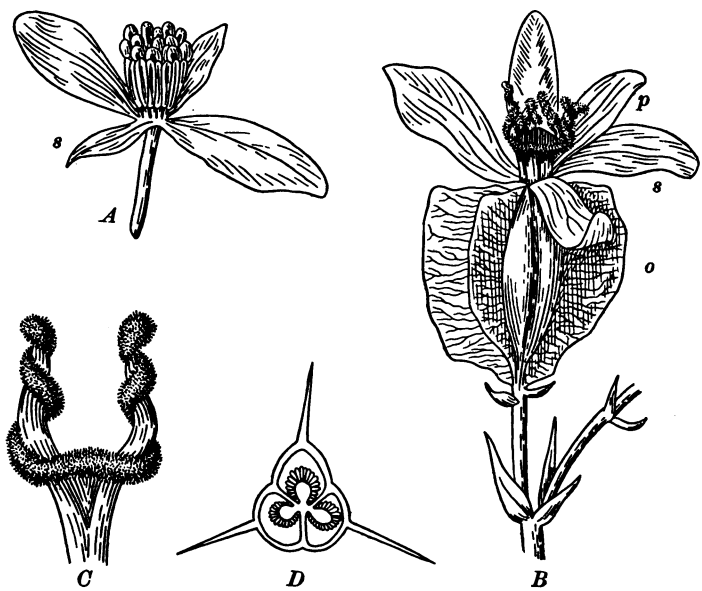


FIG. 18. — Begonia Flowers.

A, staminate flower; *B*, pistillate flower; *C*, twisted stigmas, enlarged; *D*, cross-section of ovary; *o*, ovary; *s*, sepals; *p*, petals.

broadly and unevenly lanceolate or ovate-lanceolate, half-heart-shaped or broadly one-eared at the base, acute, nearly or quite entire, smooth, dull green above, sometimes tinged with reddish below. Peduncles several–many-flowered, reddish, slender, somewhat nodding. Flowers showy, medium sized, scarlet. Fruit showy, scarlet, very broadly winged. Cultivated from Peru. [Often called *B. rubra.*]

4. B. incarnata, Link and Otto. Herbaceous or mainly so, rather tall (2–4 ft.), stems clustered, slightly reclining, hairy when young,

at length smoother. Leaves broadly and very unequally ovate-lanceolate, tapering toward the tip but at the extremity somewhat blunt, half-heart-shaped at the base, somewhat lobed and sinuate-toothed, rough-hairy above and below and on the petioles, dark green above with coppery streaks along the veins. Flowers on short peduncles, few, of medium size, beautiful rose-pink in the bud, becoming almost white, thickly covered outside with soft, moss-like hairs. Cultivated from Mexico. [Often called *B. metallica.*]

5. **B. semperflorens, Link and Otto.** Stems smooth, herbaceous, rather fleshy, branching near the ground and reclining. Leaves obtuse or nearly so, broadly ovate, somewhat unevenly heart-shaped or tapering at the base, irregularly serrate, or scalloped and wavy, smooth, dark green, and very glossy above; stipules rather large, nearly ovate. Flowers in small, axillary clusters near the top of the stem, whitish to crimson, about $1\frac{1}{4}$ in. in diameter. Ovary in fruit very broadly winged. An easily grown but homely species. Cultivated from S. Brazil.

69. CACTACEÆ. Cactus Family.

Plants usually with very fleshy and much thickened, often globular or cylindrical stems (Fig. 49). Leaves usually wanting. Flowers sessile, solitary, often very showy. Perianth consisting of several rows of sepals and petals, adnate below to the ovary. Stamens many, with slender filaments, borne on the inside of the perianth-tube. Style 1; stigmas numerous; ovary 1-celled, many-ovuled. Fruit a many-seeded berry.

I. OPUNTIA, Tourn.

Stem composed of a series of flattened joints, which are usually leafless when full grown. Leaves very small, awl-shaped, spirally arranged, appearing on the young joints, but soon dropping off, with barbed bristles and sometimes spines in their axils. Flowers yellow. Sepals and petals not much united into a tube. Fruit often eatable.

1. **O. vulgaris, Mill.** Common Prickly Pear. Prostrate or nearly so, pale green. Leaves about $\frac{1}{6}$ in. long, rather scale-like; bristles many, with few or no spines. Flowers 2 in. or more in diameter, with about 8 petals. Fruit about 1 in. long, crimson

when ripe, eatable. Dry rocks and sandy ground, from Massachusetts south along the coast.

2. **O. Rafinesquii, Engelm.** Prostrate, green. Leaves ¼–½ in. long, awl-shaped, spreading; bristles often intermixed with a few small spines and a larger one ¾–1 in. long. Flowers larger than in No. 1 and with 10–12 petals. Fruit about 1½ in. long, much tapered at the base. In poor soil.

3. **O. missouriensis, DC.** Prostrate, light green. Leaves very small, with bristles and 5–10 spines in their axils. Flowers 2–3 in. in diameter. Fruit dry and spiny. Wisconsin, S. and W.

II. PHYLLOCACTUS, Link.

Stems cylindrical when old, with long, flattened, fleshy but leaf-like, sinuate or serrate branches. Flowers nearly or quite regular, from the notches in the margins of the joints.

1. **P. Ackermanni, L.** Flowers very showy, bright red. Perianth-tube shorter than the petals. Sepals scattered, small and bract-like. Petals many, 2–3 in. long, widely spreading, somewhat channeled, sharp-pointed. Cultivated from Mexico.

III. CEREUS, DC.

Stem more or less prismatic but strongly ridged, with bundles of spines borne on the ridges, sometimes prostrate or trailing, sometimes erect, columnar, and 50 or 60 ft. high. Flowers usually showy, borne on the sides of the stem, generally with a rather long perianth-tube, which is covered outside with scale-like sepals, usually with tufts of wool in their axils. Petals many, mostly long and spreading.

1. **C. speciocissimus, DC.** Stems 2–3 ft. high, with 3–4 broad-winged and sinuate ridges. Flowers open in the daytime and lasting several days, red or crimson, very showy. Petals longer than the tube, stamens white, drooping, very numerous. Commonly cultivated from Mexico.

2. **C. grandiflorus, Mill.** NIGHT-BLOOMING CEREUS. Stems long, climbing by aerial roots, nearly cylindrical, but with 5 or more blunt angles. Flowers very showy, opening only for one night, wilting early in the morning, extremely fragrant. Sepals dull yellow. Petals pearly white, spreading, 6–8 in. long. Cultivated from Mexico.

70. ŒNOTHERACEÆ. Evening Primrose Family.

Herbs, rarely shrubs or trees. Leaves opposite or alternate, without stipules. Flowers regular. Calyx-tube adnate to the ovary, its margin 2–4-lobed. Petals 2–4, rarely wanting, perigynous, quickly falling off. Stamens 1–8. Ovary usually 4-celled; style thread-like; stigma entire or 4-lobed; ovules 1 or more in the inner angle of each cell. Fruit a capsule, berry, or stone-fruit. Seeds 1 or more, smooth or hairy.

I. ŒNOTHERA, L.

Herbs, rarely shrubby. Leaves alternate. Flowers large, yellow, red, or purple. Calyx-tube 4-angled. Petals 4. Stamens 8. Capsule usually 4-celled, many-seeded.

1. **Œ. fruticosa, L.** Sundrops. Biennial or perennial. Stem erect, often rather stout, 1–3 ft. high, downy or sometimes smooth. Leaves lance-oblong, or in one variety linear or nearly so, usually minutely toothed. Racemes often corymbed. Flowers open in the daytime, showy, yellow, 1–2 in. in diameter. Pod nearly sessile, ellipsoidal, with prominent ribs and strong wings. Dry soil, common.

2. **Œ. pumila, L.** Small Sundrops. Much like the preceding, but smaller. Leaves oblanceolate or oblong, entire. Flowers ½–1 in. in diameter. Pod club-shaped. In dry soil.

II. FUCHSIA, L.

Herbs, shrubs, or trees. Leaves opposite or 3 in a whorl. Flowers showy. Calyx colored, tubular-funnel-shaped, the tube extending much beyond the ovary, the margin 4-lobed. Petals 4, borne in the throat of the calyx. Stamens 8, projecting outside the corolla. Capsule berry-like, ellipsoidal, 4-angled.

1. **F. macrostemma, Ruiz and Pav.** Common Fuchsia, Ladies' Eardrop. Smooth. Leaves slender-petioled, toothed. Flowers on long, drooping peduncles from the axils of the leaves. Calyx-tube oblong or a short cylinder, not as long as its spreading lobes. Petals obovate and notched, wrapped spirally around the projecting fila-

ments and style. Found in many varieties, sometimes the calyx white or nearly so and the petals dark or with dark calyx and light petals. Cultivated from Chili.

III. CIRCÆA, Tourn.

Slender, erect herbs, with creeping rootstocks. Stem simple. Leaves opposite, petioled. Flowers small, in terminal and lateral racemes. Calyx-tube ovoid, the limb 2-parted, reflexed, deciduous. Petals 2, inversely heart-shaped, inserted with the 2 stamens under a margin of a disk which is borne on the pistil. Ovary 1–2-celled; style thread-like; stigma knobbed, 2-lobed ovules, 1 in each cell. Fruit ovoid, not splitting open, covered with hooked bristles.

1. **C. lutetiana, L.** ENCHANTER'S NIGHTSHADE. Stem 1–2 ft. high, glandular-downy. Leaves ovate, faintly toothed, long-petioled. Flowers $\frac{1}{8}$ in. in diameter, white or pink, on slender pedicels, jointed at the base. Damp, shaded places; very common.

71. ARALIACEÆ. GINSENG FAMILY.

Herbs, shrubs, or trees. Leaves alternate, simple or compound; stipules adnate to the petiole or wanting. Flowers regular, in umbels or heads. Limb of the calyx borne on top of the ovary, very short. Petals 5, very deciduous. Stamens 5, filaments bent inward, anthers versatile. Ovary 2-celled or several-celled; styles or stigmas as many as the cells; ovule 1 in each cell. Fruit a stone-fruit or berry. [The English ivy, an important member of the family, flowers too late for school study.]

ARALIA, Tourn.

Perennial plants with pungent or spicy roots, bark, and fruit. Leaves once or more compound. Flowers more or less monœcious, white or greenish, in umbels. Stone-fruit, berry-like.

1. **A. hispida, Vent.** BRISTLY SARSAPARILLA, WILD ELDER. Stem 1–2 ft. high, rather shrubby below, with prickly bristles. Leaves once or twice pinnate; leaflets ovate, acute, cut-serrate and

often lobed. Peduncle bearing several umbels of cream-colored flowers, in a terminal corymb. Fruit blue-black. Dry fields and pastures E.

2. **A. nudicaulis, L.** SARSAPARILLA. Perennial herb; roots very long, somewhat fleshy, aromatic; stem very short or none. Leaf solitary, from a sheathing base, petioled, 6–12 in. long; compound in threes, each division 3–5-pinnate; leaflets oval or ovate, taper-pointed, finely and sharply serrate, smooth above, often downy below. Scape nearly as long as the petiole, usually bearing 3 short, peduncled umbels. Flowers greenish. Styles distinct. Fruit globose, black. In rich woods.

72. UMBELLIFERÆ. PARSLEY FAMILY.

Herbs, usually with hollow, grooved stems. Flowers small, generally in umbels. Calyx-tube adnate to the ovary; limb of the calyx either wanting or present only as a 5-toothed rim or margin around the top of the ovary. Petals 5. Stamens 5, inserted on the disk, which is borne by the ovary (Fig. 19). Ovary 2-celled and 2-ovuled (Fig. 19), ripening into 2 akene-like carpels, which separate from each other. Each carpel bears 5 longitudinal ribs, in the furrows between which secondary ribs frequently occur. On a cross-section of the fruit, oil-tubes are seen, traversing the interspaces between the ribs, and near the surface of the fruit (Fig. 19). The seeds contain a small embryo, enclosed in considerable endosperm. [The family is a difficult one, since the flowers are so much alike that the species are distinguished from each other mainly by minute characteristics of the fruit.]

I. ERYNGIUM, Tourn.

Annual, biennial, or perennial herbs. Stems erect or creeping. Leaves simple, mostly linear and spiny-toothed. Flowers white or blue, in dense, bracted heads or spikes, flowers bracteolate. Calyx-teeth rigid, persistent. Petals erect, pointed. Styles slender. Fruit top-shaped, scaly or granular, ribs wanting, oil-tubes usually 5, minute.*

1. **E. yuccæfolium, Michx.** BUTTON SNAKEROOT, RATTLESNAKE MASTER. Perennial. Stem erect, branched above, striate, covered with a bloom, 2–3 ft. high. Leaves linear, often 2 ft. or more in length, rigid, covered with a bloom, parallel-veined, fringed with white bristles. Bracts shorter than the heads, entire, bracteoles similar but smaller. Flowers white. Fruit scaly. In damp soil.*

II. SANICULA, Tourn.

Slender, erect, perennial herbs. Rootstock short, stout, creeping. Leaves palmately cut. Umbels small, somewhat globular, irregularly compound; bracts leafy; bracteoles few;

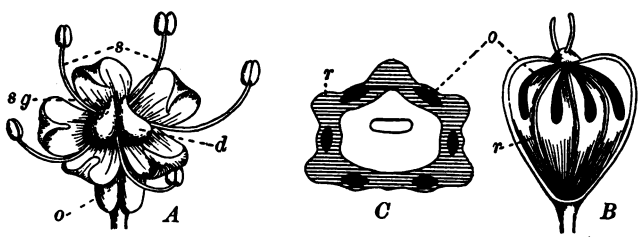


FIG. 19.—Flower and Fruit of *Umbelliferæ*.

A, flower of *Fœniculum*; *B*, fruit of *Heracleum*; *C*, fruit of *Heracleum*, cross-section; *o* (in *A*), ovary; *d*, disk; *sg*, stigma; *s*, stamens; *o* (in *B*, and *C*), oil-tubes; *r*, ribs. *A*, *B*, and *C* all enlarged.

flowers perfect or staminate, greenish or yellowish. Calyx-teeth as long as the small petals, sharp-pointed. Fruit ovoid, covered with hooked prickles, ribless, each carpel with 5 oil-tubes.

1. **S. marylandica, L.** SANICLE, BLACK SNAKEROOT. Stem rather stout, 1½–4 ft. high. Leaves 3–7-parted, the divisions irregularly serrate or dentate and often cut. Petals greenish-white, very small. Fruit with two slender, recurved styles at the apex. Rich woods.

III. ERIGENIA, Nutt.

A little smooth plant with a slender, unbranched stem, from a deep, nearly globular tuber. Leaves 1 or 2, twice or thrice compound in threes. Flowers few, small, in an imperfect leafy-bracted umbel. Calyx-teeth wanting. Petals obovate

or spatulate. Fruit smooth, roundish, notched at both ends, the two carpels touching only at top and bottom, each with 5 slender ribs.

1. **E. bulbosa, Nutt.** HARBINGER OF SPRING, TURKEY PEA, PEPPER-AND-SALT. Stem scape-like, with a leaf which forms an involucre to the flower-cluster. Petals white, anthers brown-purple. A pretty, though inconspicuous plant; welcomed as one of the earliest spring flowers S.

IV. OSMORRHIZA, Raf.

Perennials, springing from stout, aromatic roots. Leaves compound in threes. Flowers white, in compound umbels. Calyx-teeth wanting. Fruit linear or nearly so, tapering at the base, with 5 equal bristly ribs, without oil-tubes.

1. **O. brevistylis, DC.** HAIRY SWEET CICELY. Rather stout and hairy, especially when young, 1½–3 ft. high. Lower leaves on long petioles, large, twice compound in threes, the divisions ovate or oval, cut-toothed, upper leaves nearly sessile, less compound. Umbels with long peduncles and spreading rays. Style and its enlarged base somewhat conical. Root nauseous. Rich woods.

2. **O. longistylis, DC.** SMOOTH-LEAVED SWEET CICELY. Much like No. 1 in general appearance. Smooth or nearly so. Style rather thread-like. Root of a pleasant aromatic flavor (as is also the fruit). Woods.

Caution. So many plants of this family have actively poisonous roots and foliage that it is unsafe for any one but a botanist, who can distinguish the poisonous species from the harmless ones, to taste them.

V. CARUM, L.

Herbs, with slender, smooth stems. Leaves pinnately compound, smooth. Umbels compound. Flowers white or yellowish. Calyx-teeth minute. Fruit smooth, oblong or ovate, with thread-like ribs; oil-tube single in the intervals between the ribs; base of the styles thickened into a conical mass.

1. **C. Carui, L.** CARAWAY. Perennial. Leaves large, with the leaflets cut into numerous thread-like divisions. Flowers white. Fruit aromatic, used somewhat in this country and more in N. Europe for flavoring cookies, bread, etc. Introduced from Europe.

VI. THASPIUM, Nutt.

Perennial herbs. Stem erect. Leaves 1–2, compound in threes. Umbels compound, involucre and involucels usually wanting. Flowers yellow or purple. Calyx-teeth small, acute. Fruit ovoid or oblong, somewhat laterally compressed; carpels smooth, strongly ribbed, oil-tubes between the ribs.*

1. **T. barbinode, Nutt.** HAIRY MEADOW PARSNIP. Stem erect, branching above, downy at the nodes, 2–7 ft. high. Leaves petioled, slightly downy, leaflets mostly thin, ovate, toothed, incised or lobed toward the apex, entire toward the base. Umbels long-peduncled, few-rayed. Fruit oblong, lateral and central ribs strongly winged. Along streams.*

VII. ZIZIA, Koch.

Smooth perennials. Leaves generally as in *Thaspium*. Involucre wanting; involucels of small bractlets. Umbels compound. Flowers yellow. Calyx-teeth prominent. Fruit more or less ovoid, smooth, with thread-like ribs, oil-tubes large and solitary between the ribs and a little one in each rib; the central fruit of each umbellet sessile.

1. **Z. aurea, Koch.** MEADOW PARSNIP, GOLDEN ALEXANDERS. Smooth, stem erect, 1–2 ft. high. Root-leaves mostly heart-shaped and serrate, stem-leaves usually once compound in threes. Flowers deep yellow. Fruit between globose and ovoid, about $\frac{1}{8}$ in. long, all the ribs generally winged. Woods and thickets.

VIII. PASTINACA, L.

A tall, smooth biennial with a stout, grooved stem. Leaves pinnate. Flowers yellow, in large umbels, with hardly any involucre. Calyx-teeth wanting. Fruit oval, very flat, with a thin wing, oil-tubes single, running the whole length.

1. **P. sativa, L.** COMMON PARSNIP. Cultivated from Europe for its large, conical, sweet, and edible roots. Also introduced in waste places.

IX. HERACLEUM, L.

A stout perennial, with the very large leaves compound in threes. Umbels large, compound, with the involucels many-

leaved. Petals white, inversely heart-shaped, the outer ones usually 2-cleft and larger. Calyx with 5 small teeth. Fruit tipped with a thick, conical enlargement of the style, with three blunt ribs on the outer surface of each carpel and a large oil-tube in each interval between the ribs. Seeds flat.

1. **H. lanatum, Michx.** Cow Parsnip. Stem grooved and woolly, 4–8 ft. high. Leaflets petioled, broad, deeply and irregularly toothed.

X. DAUCUS, L

Annual or biennial, bristly-hairy herbs. Leaves pinnately twice or more compound, the divisions slender. Umbels compound, many-rayed. Flowers small, white. Calyx-teeth slender or wanting. Petals notched, the point bent inward, often unequal. Fruit ovoid or ellipsoid, with rows of spines.

1. **D. Carota, L.** Common Carrot. Erect, 1–3 ft. high, with a conical, fleshy, orange-colored root. Lower and root-leaves 2–3 pinnate. Central flower of each umbel and sometimes of each umbellet larger and very dark purple, with the corolla irregular. Cultivated from Europe for the edible roots; also introduced in pastures and meadows and along roadsides E.

73. CORNACEÆ. Dogwood Family.

Shrubs or trees, rarely herbs. Leaves opposite or alternate, without stipules. Flowers small, regular, variously clustered. Calyx-tube adnate to the ovary; limb of the calyx very short. Petals 4–5, borne on the margin of a disk on top of the ovary. Stamens 4–5, inserted with the petals. Ovary 1–4-celled, with one ovule in each cell; style 1. Fruit (in our species) a 1–2-celled and 1–2-seeded stone-fruit.

I. CORNUS, Tourn.

Trees, shrubs, or herbs. Leaves usually opposite. Flowers in forking cymes, or in umbels or heads, each with an involucre, white or yellow. Calyx-teeth 4. Petals 4. Stamens 4. Ovary 2-celled. Stone-fruit, ovoidal or ellipsoidal, the stone 2-celled.

1. **C. canadensis, L.** DWARF CORNEL, BUNCH-BERRY, PUDDING-BERRY. Stem herbaceous, excepting at the base, low (3–9 in.), and unbranched. Rootstock rather woody, slender, and creeping. Leaves in what appears to be a whorl of 4 or 6 at the summit of the stem, sessile, ovate, oval or nearly so, acute at each end, entire, smooth or very slightly downy. Flower-stalk slender, ½–1½ in. long, with a whorl of 4–6 large, white, petal-like bracts, forming an involucre round the small head of greenish flowers; the head with its involucre appearing to others than botanists like a single flower. Fruit nearly spherical, scarlet, about ¼ in. in diameter, in a close cluster, sweet and eatable, though rather insipid. Damp woods, especially N.

2. **C. florida, L.** FLOWERING DOGWOOD. Small trees; bark rough, black. Leaves opposite, petioled, ovate to ovate-lanceolate, entire, green and shining above, paler and often downy beneath. Flowers small, greenish, in heads which are subtended by 4 large, white or pink, inversely heart-shaped bracts, thickened and greenish at the notch. Fruit ovoid, bright red. In rich woods S. and E.*

3. **C. circinata, L'Her.** ROUND-LEAVED DOGWOOD. A shrub 3–10 ft. high, with green, warty twigs. Leaves petioled, roundish-oval, contracted to an abrupt point, entire, usually rounded or truncate at the base, pale and soft-downy beneath. Flowers in flat cymes, 1½–2½ in. in diameter. Fruit globose, light blue, ¼ in. or less in diameter. Thickets often in rocky soil N. and along Alleghany Mountains.

4. **C. sericea, L.** KINNIKINNIK. A shrub, 6–10 ft. high; twigs purple, downy when young. Leaves opposite, petioled, ovate or oblong, taper-pointed, smooth above, silky-downy below. Flowers white, in rather close cymes. Fruit blue, stone somewhat oblique. In low woods.*

5. **C. asperifolia, Michx.** ROUGH-LEAVED DOGWOOD. A shrub 8–12 ft. high; twigs slender, reddish-brown, often warty, densely downy when young. Leaves opposite, short-petioled, lance-ovate or oblong, acute or taper-pointed, with rough down above, downy-woolly below. Cymes flat, spreading, the peduncle and branches covered with rough down. Flowers white. Fruit white or pale blue, stone depressed-globose. In dry woods.*

6. **C. stolonifera, Michx.** RED OSIER DOGWOOD. A shrub 3–15 ft. high, with smooth, reddish-purple bark on all the younger twigs, spreading by suckers from the base and therefore the stems usually clustered. Leaves on rather slender petioles, acute or taper-pointed, rounded or tapered at the base, covered at least beneath by very fine, closely appressed hairs. Fruit white or nearly so, globose, ¼ in. or more in diameter. Common in wet ground, especially N.

7. **C. alternifolia, L.** ALTERNATE-LEAVED DOGWOOD. A shrub or small tree; twigs greenish, striped. Leaves alternate, often

clustered at the ends of the twigs, long-petioled, oval, acute at the apex and often at the base, minutely toothed, pale and covered with fine, appressed hairs beneath; cymes loose and open. Flowers white. Fruit deep blue. Banks of streams.*

II. NYSSA, L.

Trees or shrubs. Leaves alternate, petioled, entire or few-toothed. Flowers somewhat monœcious or dicœcious, the staminate in many-flowered heads or cymes, the pistillate in small clusters or solitary. Calyx-tube 5-toothed or truncate. Petals minute or wanting. Stamens 5–10. Ovary 1-celled, 1-ovuled; style long and recurved. Fruit a 1-seeded stone-fruit.

1. **N. sylvatica, Marsh.** Black Gum. A tree with widely spreading branches and dark, rough bark, wood light-colored, very tough, base of trunk often enlarged. Leaves often clustered at the ends of the twigs, oval or obovate, taper-pointed or obtuse at the apex, entire, smooth and shining above, downy beneath, becoming bright red in autumn. Staminate flowers in heads. Pistillate 3–10 in a long-peduncled cluster. Fruit ovoid, dark blue or nearly black, ½ in. long, stone slightly ridged. In rich, wet soil S. and E.*

2. **N. uniflora, Wang.** Tupelo. A large tree, similar to the preceding. Leaves long-petioled, oval or ovate, acute at each end, entire or coarsely toothed, the lower sometimes heart-shaped, smooth above, downy beneath, 4–8 in. long. Staminate flowers in heads. Pistillate flowers on long peduncles, solitary. Fruit ovoid, dark blue, stone sharply ridged. In swamps S. and E.*

74. PYROLACEÆ. Pyrola Family.

Perennial herbs, evergreen or else pale and without chlorophyll. Petals usually free from each other and falling off separately after flowering. Stamens hypogynous, the anthers without appendages and opening by pores or by a transverse slit. Fruit a capsule containing a great number of very small seeds.

I. CHIMAPHILA, Pursh.

Low plants, nearly herbaceous, with reclining stems, from long, horizontal, underground shoots. Leaves opposite or

whorled, leathery, shining, evergreen, on short petioles. Flowers fragrant, white or purplish, on a corymb or umbel which terminates the stem. Calyx 5-cleft or 5-parted, persistent. Petals 5, concave, roundish, spreading. Stamens 10, the filaments enlarged and downy in the middle, the anthers somewhat 4-celled, opening when mature by pores at the outer end. Style top-shaped, nearly buried in the top of the globular ovary. Capsule erect, 5-celled.

1. **C. umbellata, Nutt.** PRINCE'S PINE, PIPSISSEWA. Branches leafy, 4–12 in. high. Leaves spatulate or wedge-oblanceolate, obtuse or nearly so, sharply serrate, very green and glossy. Flowers several, umbelled or somewhat corymbed, white or pinkish, the anthers violet. Dry woods, especially under pine trees.

2. **C. maculata, Pursh.** SPOTTED WINTERGREEN. Much resembles No. 1, but has only scattered teeth on the leaves, which are mottled with white on the upper surface and are often broad or rounded at the base. Dry woods.

II. PYROLA, Tourn.

Biennial or perennial, almost woody herbs; rootstock slender and creeping. Leaves mostly radical, with broad petioles, evergreen. Flowers in racemes, nodding, on a bracted scape. Sepals 5. Corolla usually globose, of 5 free or nearly free, roundish petals. Stamens 10, in pairs opposite the petals, hypogynous; anthers as in *Chimaphila*. Capsule globose, 5-celled, splitting into 5 valves, the latter usually with downy edges.

1. **P. elliptica, Nutt.** SHIN-LEAF. Scape 5–10 in. high. Leaf-blades obovate-oval or elliptical, rather thin, dark green, faintly scalloped, almost always longer than their margined petioles. Flowers greenish-white, very fragrant. Rich, usually dry woods, especially N.

2. **P. rotundifolia, L.** ROUND-LEAVED WINTERGREEN. Scape 6–20 in. high. Leaf-blades roundish or oval, leathery, shining above, faintly scalloped, often rounded at the base or almost heart-shaped, usually shorter than the slightly margined petioles. Flowers white, very fragrant. Varies greatly. Usually in dry woods N.

III. MONOTROPA, L.

Leafless, simple, erect, white, brown, or red root-parasites or saprophytes or fed by slender fungus-threads which cluster on the roots. Stem scaly, the upper scales often passing into bracts. Flowers solitary or in spikes or racemes. Sepals or bracts 2–5, erect, deciduous. Petals 4 or 5, erect or spreading. Stamens 8 or 10, hypogynous, the filaments awl-shaped, anthers kidney-shaped. Ovary 4–5-celled; style simple; stigma disk-like, with 4–5 rays.

1. **M. uniflora, L.** INDIAN PIPE. Stem smooth, fleshy, 4–6 in. high. Bracts ovate or lanceolate. Flower single, tubular, ¾–1 in. long, inodorous. Stamens a little shorter than the petals. Capsule angled, ½–¾ in. long. Whole plant waxy-white, turning black in drying. In moist, shady woods N. and E.*

2. **M. Hypopitys, L.** PINE-SAP. Stems single or clustered, white or reddish, 4–8 in. high. Bracts ovate-lanceolate. Flowers several, in a scaly raceme, fragrant, ½–¾ in. long. Capsule oval, ¼ in. long. In dry, shady woods, especially under oaks or pines.*

75. ERICACEÆ. HEATH FAMILY.

Usually shrubs or slightly shrubby plants. Leaves simple, generally alternate. Corolla commonly regular, 4–5-cleft, sometimes polypetalous. Stamens hypogynous, distinct, as many or twice as many as the petals, the anthers mostly opening by a hole at the end. Ovary usually with as many cells as there are corolla-lobes; style 1. Seeds small, with endosperm.

A.

Shrubs or small trees. Calyx free from the ovary. Corolla hypogynous, usually gamopetalous.

Shrubs or small trees, with showy flowers. Anthers not held down in pockets in the corolla. Rhododendron, I.

Shrubs, with showy flowers. Anthers at first held in pocket-like depressions in the corolla. Kalmia, II.

Shrubs, with small, mostly white, urn-shaped flowers. Andromeda, III.

A prostrate plant, hardly at all shrubby. Leaves rather large, often 1½ in. wide, and veiny. Epigæa, IV.

A trailing plant with small (about ¼ in. wide), thick, evergreen leaves. Arctostaphylos, V.

B.

Shrubs. Calyx-tube adnate to the ovary, on which the gamopetalous corolla and the stamens are borne. Fruit a true berry or resembling one.

Fruit a berry-like stone-fruit, with 10 nutlets which resemble seeds. Gaylussacia, VI.

Fruit a berry with many small seeds. Vaccinium, VII.

I. RHODODENDRON, L.

Shrubs, often much branched. Leaves alternate, thin, deciduous. Flowers very showy, in terminal umbels, from scaly buds, which became well developed the previous season. Calyx very small, 5-parted. Corolla bell-shaped, the tube long and slender, the limb spreading and somewhat one-sided. Stamens 5 or 10, declined; anthers awnless. Style long and slender, declined; stigma knobbed. Capsule oblong or linear, 5-celled, many-seeded; seeds very small, scale-like.

1. **R. nudiflorum, Torr.** WILD HONEYSUCKLE, ELECTION PINK. A branching shrub, 4–6 ft. high; twigs smooth or with a few coarse hairs. Leaves obovate or oblong, ciliate-serrate, downy, becoming smooth above; petioles short. Flowers appearing with or before the leaves, pink or white, sometimes yellowish, fragrant, 1–2 in. wide, tube downy but not glandular. Capsule erect, linear-oblong, ⅔–¾ in. long. Swamps and banks of streams; flowers extremely variable in size and color.*

2. **R. viscosum, Torr.** SWAMP HONEYSUCKLE, SWAMP PINK. A shrub, 4–6 ft. high; branches hairy. Leaves obovate, leathery, mucronate at the apex, mostly smooth above, downy on the veins beneath; petioles very short. Flowers appearing later than the leaves, white, fragrant, 1½–2 in. long; tube long, glandular-viscid; capsule erect, ½–⅔ in. long, bristly. In swamps.*

II. KALMIA, L.

Erect and branching shrubs. Leaves alternate, opposite or in threes, entire, leathery, evergreen. Flowers showy, in corymbs or 1–3 in the axils. Calyx 5-parted. Corolla flat-bell-shaped or wheel-shaped, 5-lobed. Stamens 10, the anthers placed in pouches in the corolla, filaments straightening elastically at maturity and so bringing the anthers in contact with any large insect-visitor. Style long and slender. Capsule globose, 5-celled, many-seeded.

1. **K. angustifolia, L.** SHEEP LAUREL. A shrub, 1–3 ft. high, with smooth, nearly erect branches. Leaves petioled, opposite or in threes, oblong, obtuse at both ends, dark green above, paler beneath. Corymbs lateral, glandular. Flowers purple or crimson, $\frac{1}{2}$–$\frac{1}{3}$ in broad; pedicels slender, recurved in fruit. Calyx downy, persistent. Style persistent; capsule depressed-globose. On hillsides; abundant northward.*

2. **K. latifolia, L.** CALICO BUSH, MOUNTAIN LAUREL. A shrub, 4–10 ft. high. Branches stout, smooth. Leaves mostly alternate, petioled, elliptical or oval, acute at each end, smooth and green on both sides. Corymbs terminal, compound. Flowers white to rose-color, showy, 1 in. broad. Calyx and corolla glandular; pedicels long, slender, sticky-glandular, erect in fruit; calyx and style persistent. Shady banks on rocky or sandy soil.*

III. ANDROMEDA, L.

A small shrub, with scaly buds. Leaves alternate. Flowers in nearly terminal umbels, white or pink. Sepals 4. Corolla hypogynous, globose, with a 5-cleft, reflexed limb. Stamens 10, hypogynous, not projecting beyond the corolla; filaments bearded. Ovary 5-celled; style simple; stigma obtuse or enlarged. Capsule somewhat globose, 5-valved. Seeds small, smooth and hard.

1. **A. polifolia, L.** WILD ROSEMARY. Stems long, rooting at the base, with somewhat erect, twiggy, smooth branches, 6–18 in. high. Leaves elliptical-lanceolate, smooth and shining, thick and evergreen. Flowers small, purplish. Wet bogs, common N.

2. **A. Mariana, L.** STAGGER-BUSH. Usually smooth, 2–4 ft. high. Leaves moderately thin and deciduous, oblong or oval, 1–3 in. long. Flowers rather small, white or pinkish, nodding, in racemes on the

naked shoots of the preceding year. Low grounds. Foliage said to be poisonous to young browsing animals.

IV. EPIGÆA, L.

Prostrate or trailing shrubs. Stems rusty-downy, 6–12 in. long. Leaves alternate, leathery, evergreen. Flowers in bracted, terminal close racemes or clusters. Calyx 5-parted, persistent. Corolla salver-shaped, 5-lobed. Stamens 10, about the length of the corolla-tube. Ovary 5-lobed; style columnar; stigma 5-lobed. Fruit a globose, hairy, 5-celled, many-seeded capsule.*

1. **E. repens, L.** GROUND LAUREL, TRAILING ARBUTUS, MAYFLOWER. Stems creeping, the young twigs ascending. Leaves oval or somewhat heart-shaped, entire, netted-veined, smooth above, rough-hairy beneath; petioles short, rough-hairy. Racemes shorter than the leaves. Flowers white to bright pink, ½ in. broad, very fragrant. In dry woods, often covering considerable areas.*

V. ARCTOSTAPHYLOS, Adans.

Shrubs. Leaves alternate, evergreen. Flowers pinkish or nearly white, in terminal, bracted racemes. Calyx 4–5-parted, persistent. Corolla 4–5-lobed, the lobes recurved. Ovary 5–10-celled, each cell containing 1 ovule. Fruit a berry-like stone-fruit, with 5–10 nutlets.

1. **A. Uva-ursi, Spreng.** BEARBERRY. In trailing clumps, the branches 1–2 ft. high. Leaves evergreen, finely woolly, obovate or spatulate, entire, very leathery. Racemes few-flowered, very short. Corolla urn-shaped, the teeth hairy within. Berry red, ¼ in. in diameter. Rocks and dry hilltops, especially N.

VI. GAYLUSSACIA, HBK.

Low, branching shrubs, mostly resinous-dotted. Leaves serrate or entire. Flowers small, white or pink, in lateral, bracted racemes, nodding; pedicels usually 2-bracteolate. Calyx-tube short, obconic, the lobes persistent. Corolla ovoid to bell-shaped, 5-lobed, the lobes erect or recurved. Stamens equal, usually included; anthers awnless. Fruit a 10-seeded, berry-like stone-fruit.*

1. **G. frondosa, Torr. and Gray.** TANGLEBERRY. An erect shrub, 1–3 ft. high; branches spreading, slender, gray, slightly downy. Leaves entire, oblong or obovate, obtuse, thin, smooth and green above, paler, downy, and with resinous dots beneath; petioles short. Racemes few-flowered. Corolla small, greenish-pink, short-bell-shaped; bracts small, oblong, shorter than the pedicels. Berry depressed-globose, dark blue, with bloom, sweet, about $\frac{1}{2}$ in. in diameter. On low ground.*

2. **G. resinosa, Torr. and Gray.** HUCKLEBERRY. A much-branched, stiff shrub, 1–3 ft. high, slightly downy when young. Leaves oval or oblong, rarely obovate, obtuse or nearly so, entire, covered when young with little resinous particles. Flowers in short, one-sided racemes. Corolla at first conical-ovoid, becoming afterward nearly cylindrical, pink or reddish. Fruit (in the typical form) black, with no bloom, sweet, the seed-like nutlets rather large. Woods and pastures in sandy soil.

VII. VACCINIUM, L.

Shrubs or small trees. Leaves entire or serrulate, often leathery and evergreen. Flowers terminal or lateral, clustered or solitary, nodding. Pedicels 2-bracteolate. Calyx-tube globose or hemispherical, 4–5-lobed, persistent. Corolla urn-shaped, cylindrical or bell-shaped, 4–5-lobed. Stamens twice as many as the lobes of the corolla, anthers awned or awnless. Ovary 4–5-celled, each cell partially divided by a partition, which makes the ovary appear 8–10-celled; style slender; stigma simple. Fruit a many-seeded berry.*

1. **V. corymbosum, L.** HIGH-BUSH BLUEBERRY. An erect shrub, 6–12 ft. high; branches stiff, young twigs minutely warty. Leaves deciduous, oval to ovate-lanceolate, acute, margins bristly, serrulate, smooth or downy, short-petioled. Racemes numerous, appearing with or before the leaves. Bracts oval or oblong, deciduous. Flowers white or pink. Corolla almost as long as the pedicel, cylindrical. Berry globose, blue or black, flavor slightly acid, pleasant. Common in woods and thickets, whole plant extremely variable.*

2. **V. pennsylvanicum, Lam.** DWARF BLUEBERRY, LOW BLUEBERRY. Low (usually 6–12 in. high, sometimes 2 ft. high) and smooth, with warty, green branches. Leaves oblong or oblong-lanceolate, sharply serrate, with little bristle-pointed teeth, both sides smooth and shining except for down occasionally on the midrib and veins below, pointed at both ends. Flowers few in a cluster, longer than their minute pedicels. Corolla oblong, bell-shaped,

a little narrowed at the throat, white or pinkish. Berry blue, with much bloom, ripening earlier than the other eatable species, sweeter than No. 1, but not so high-flavored. In dry or sandy soil, especially N.

3. **V. stamineum, L.** DEERBERRY, SQUAW HUCKLEBERRY. An erect shrub, 3–10 ft. high; branches widely spreading, twigs smooth or minutely downy. Leaves deciduous, oval or oblong, acute or taper-pointed at the apex, obtuse or slightly heart-shaped at the base, firm, smooth, and green above, pale and slightly downy beneath, petioled. Racemes with leaf-like bracts. Flowers numerous, drooping, on jointed, slender pedicels. Corolla bell-shaped, purplish-green, 2-awned anthers and style projecting. Berry globose or pear-shaped, inedible. Dry woods.*

4. **V. arboreum, Marsh.** FARKLEBERRY. Tree-like, sometimes 30 ft. high; bark gray; twigs slender, smooth or downy. Leaves deciduous, ovate or oval, mucronate, entire or glandular-dentate, leathery, green above, often slightly downy beneath. Racemes with leaf-like bracts; pedicels slender, drooping. Corolla campanulate, white. Anthers included; style projecting. Berry globose, black, mealy, ripening in winter. Common in dry, open woods.*

5. **V. macrocarpon, Ait.** CRANBERRY. Stems creeping, thread-like, 1–3 ft. or more in length, the branches not quite erect, sometimes 8 in. high. Leaves usually oval or oblong, obtuse, thickish, evergreen, the younger ones with the margins somewhat rolled under. Flowers nodding. Petals strongly reflexed, deep rose-red inside at the base, pale pinkish or almost white at the tips. Stamens with the filaments hardly $\frac{1}{3}$ as long as the anthers. Fruit red or reddish-purple, ellipsoidal or nearly globose, very acid, much valued for sauce, pies, and jellies. Common in peat-bogs and wet meadows N.

76. PRIMULACEÆ. PRIMROSE FAMILY.

Herbs, with simple leaves, often most or all of them radical. Flowers perfect and regular, generally gamopetalous. Stamens commonly 5, inserted on the corolla, opposite its lobes. Pistil consisting of a single stigma and style and a (generally free) 1-celled ovary, with a free central placenta.

I. DODECATHEON, L.

A smooth, perennial herb, with a cluster of oblong or spatulate root-leaves, fibrous roots, and an unbranched scape,

leafless except for an involucre of small bracts at the summit, with a large umbel of showy, nodding flowers. Calyx deeply 5-cleft, with reflexed, lanceolate divisions. Tube of the corolla very short, the divisions of the 5-parted limb strongly reflexed. Filaments short, somewhat united at the base; anthers long, acute, and combining to form a conspicuous cone.

1. **D. meadia, L.** SHOOTING STAR, INDIAN CHIEF. Corolla varying from rose-color to white. In rich woods in most of the Middle and Southern States. Often cultivated.

II. PRIMULA, L.

Low, perennial herbs, with much-veined root-leaves; scapes, each bearing an umbel of flowers, which are often showy. Calyx tubular, decidedly angled, 5-cleft. Corolla more or less salver-shaped, with the tube widened above the insertion of the stamens; the 5 lobes of the limb often notched or cleft. Stamens 5, not protruding outside the corolla-tube. Capsule egg-shaped, splitting at the top into 5 valves, each of which may divide in halves.

1. **P. grandiflora, Lam.** TRUE PRIMROSE. Leaves spatulate or obovate-oblong. Flowers rising on separate slender pedicels from the leaf-axils. Corolla originally pale yellow, but varying to white, red, and many intermediate shades, with a broad, flat limb. Cultivated from Europe.

2. **P. sinensis, Sabine.** CHINESE PRIMROSE. A rather coarse, downy plant. Leaves round-heart-shaped, more or less lobed and cut, long-petioled. Flowers large, in umbels, usually rose-color or white. Calyx large, inflated and conical. Cultivated as a house plant.

III. TRIENTALIS, L.

Low, smooth, perennial herbs, with slender, erect, unbranched stems. Leaves lanceolate, ovate, or oblong, mostly in a whorl at the summit of the stem. Flowers one or few, terminal, on slender peduncles, small, white or pink. Sepals narrow and spreading. Corolla wheel-shaped, with usually 7 taper-pointed segments. Ovary globose; style thread-like. Capsule globose, many-seeded.

1. **T. americana, Pursh.** STAR-FLOWER, CHICKWEED WINTERGREEN. Spreading by long and slender rootstocks, branches erect, stem-like, 3–9 in. high. Leaves very thin, pale green, pointed at both ends. Flowers white. Capsules white, marked off into polygonal sections, each corresponding to 1 seed. Cold woods, common N.

IV. STEIRONEMA, Raf.

Perennial herbs. Leaves opposite or whorled, simple, entire. Flowers yellow, axillary or racemose, on slender peduncles. Calyx-tube 5-parted, persistent. Corolla 5-parted, wheel-shaped, tube very short or none, the lobes denticulate at the apex, and in the bud each one enclosing a stamen. Stamens 5, distinct or slightly united at the base, sterile rudiments often alternating with them. Ovary globose; style slender. Fruit a globose, 5-valved, few or many-seeded capsule.*

1. **S. ciliatum, Raf.** FRINGED LOOSESTRIFE. Stems erect, slender, simple, or branched, 1–3 ft. high. Leaves opposite, ovate to ovate-lanceolate, acute at the apex, rounded at the base, margins and petioles hairy-fringed; flowers solitary on axillary peduncles, $\frac{3}{4}$–1 in. broad; petals broadly ovate or roundish, denticulate; calyx shorter than the capsule. Woods and thickets.*

V. LYSIMACHIA, Tourn.

Perennials, with opposite or whorled entire leaves, which are often dotted. Calyx 5–6-parted. Corolla wheel-shaped, with its divisions commonly nearly separate. Stamens generally somewhat monadelphous at the base.

1. **L. quadrifolia, L.** FOUR-LEAVED LOOSESTRIFE. Stem erect and simple, 1–2 ft. high, hairy. Leaves whorled, most frequently in fours, broadly lanceolate. Flowers small, axillary, and solitary, on long and slender peduncles. Damp or sandy soil.

2. **L. stricta, L.** BULB-BEARING LOOSESTRIFE. Stems 1–2 ft. high, finally branching, frequently producing bulblets in the leaf-axils after flowering. Leaves abundant, generally opposite, narrowly lanceolate. Flowers small, pediceled, in a long, terminal raceme. Low or swampy ground.

VI. ANAGALLIS, Tourn.

Annual or perennial herbs; stems erect or diffuse. Leaves opposite or whorled. Flowers axillary, peduncled. Calyx-tube 5-parted, persistent. Corolla wheel-shaped, 5-parted, longer than the calyx. Stamens 5, inserted on the base of the corolla; filaments bearded. Ovary globose; style slender; stigma knobbed. Fruit a many-seeded capsule, the top coming off like a lid.*

1. **A. arvensis, L.** POOR MAN'S WEATHER-GLASS, PIMPERNEL. Annual; stem spreading, widely branched, 4-angled, smooth, 4–12 in. long. Leaves opposite, sessile, ovate, black-dotted beneath. Flowers on peduncles longer than the leaves, nodding in fruit, corolla fringed with glandular hairs, longer than the acute calyx-lobes, bright red, opening in sunshine. Capsule globose, tipped by the persistent style. Introduced, and common in fields and gardens.*

77. EBENACEÆ. EBONY FAMILY.

Trees or shrubs. Leaves alternate, entire, pinnately veined, without stipules. Flowers often dicœcious. Calyx free from the ovary, persistent. Stamens 2–4 times as many as the divisions of the corolla. Ovary 3–12-celled; ovules 1 or 2 in each cell. Fruit a berry. Mostly tropical plants.

I. DIOSPYROS, L.

Flowers dicœcious or somewhat moncœcious, the staminate ones in cymes, the pistillate ones axillary and solitary. Calyx 4–6-lobed. Corolla 4–6-lobed. Stamens in the staminate flowers usually 16, in the pistillate ones 8, imperfect. Fruit large, with the persistent calyx attached to its base, 4–8-seeded.

1. **D. virginiana, L.** PERSIMMON. Trees, with rough, black bark and very hard wood. Leaves oval or ovate-oblong, acute or acuminate at the apex, rounded or slightly cordate at the base, entire and dark green, smooth above, pale and often downy beneath, short-petioled, deciduous; flowers yellowish-white, the parts mostly in 4's; fruit globose, edible when ripe, very astringent when green; seeds large, compressed, often wanting. Fruit ripening late in the fall. Common in old fields and along roadsides S. and S.W.*

78. OLEACEÆ. Olive Family.

Shrubs or trees. Leaves opposite, simple or odd-pinnate, without stipules. Flowers in forking cymes, small, white or greenish, perfect or imperfect. Calyx free from the ovary, 4-lobed or wanting. Corolla hypogynous, regular, 4-parted or of 4 separate petals, sometimes wanting. Stamens 2, borne on the petals or hypogynous. Ovary 2-celled. Fruit 1–2-celled, each cell 1-seeded, rarely 2-seeded.

I. FRAXINUS, Tourn.

Deciduous trees. Flowers dicœcious. Petals wanting (in our species). Stamens 2, hypogynous. Fruit a 1–2-celled key, each cell 1-seeded.

1. **F. americana, L.** White Ash. A large tree; bark rough, gray; wood hard, strong, elastic; twigs and petioles smooth. Leaflets usually 7, ovate to ovate-lanceolate, taper-pointed at the apex, rounded or obtuse at the base, entire or slightly serrate, smooth above, often downy beneath, short-stalked. Flowers mostly dicœcious. Calyx of the pistillate flowers persistent. Key 1½–2 in. long, winged only at the apex; wing spatulate or oblanceolate. In rich woods and swamps.*

2. **F. pubescens, Lam.** Red Ash. A small tree; bark rough, dark gray; twigs and petioles densely velvety-downy. Leaflets 5–9, oblong-ovate to ovate-lanceolate, taper-pointed at the apex, narrowed into a short stalk at the base, finely serrate, smooth above, velvety-downy beneath. Calyx of the pistillate flowers persistent. Key 1½–2 in. long, the wing somewhat extended along the sides, oblanceolate or spatulate, often notched. Swamps and moist soil.*

3. **F. platycarpa, Michx.** Water Ash. A small tree; wood soft, light and weak; twigs smooth or downy. Leaflets 5–7, ovate or elliptical, acute at the apex, acute or obtuse at the base, entire or slightly serrate, smooth or slightly downy, stalked. Flowers dicœcious. Calyx persistent. Key often 3-angled or 3-winged, wings running nearly to the base, oblong or oval, pinnately veined. In swamps and wet soil.*

4. **F. quadrangulata, Michx.** Blue Ash. A large tree, with wood heavy, but not as tough as No. 1; the most vigorous twigs usually square. Leaflets 7–9, with short stalks, somewhat ovate or lanceolate, acute, sharply serrate. Fruit winged to the base, of nearly the same width throughout, narrowly oblong. Rich woods, especially W.

II. FORSYTHIA, Vahl.

Shrubs. Leaves opposite or in threes, appearing later than the flowers, serrate. Calyx very short, deciduous. Corolla yellow, bell-shaped, its lobes long and slender. Stamens inserted on the base of the corolla-tube. Pod 2-celled, many-seeded.

1. **F. viridissima, Lindl.** A hardy shrub, with branches erect or nearly so. Leaves all simple, lance-oblong. Calyx-lobes half as long as the tube of the corolla. Lobes of the corolla spreading, narrow-oblong, style equal in length to the tube of the corolla. Cultivated from Asia.

2. **F. suspensa, Vahl.** A hardy shrub, with drooping branches. Leaves broadly ovate, often some of them with 3 leaflets, the lateral leaflets small. Lobes of the corolla longer, broader, and more spreading than in No. 1. Style shorter than the tube of the corolla. Cultivated from Asia, less common than No. 1, often trained over porches and arbors.

III. SYRINGA, L.

Tall shrubs, forking frequently, from the failure of the terminal buds on most branches. Leaves simple, entire. Flowers in close, compound panicles. Calyx 4-toothed. Corolla salver-shaped, the tube long, the limb 4-lobed. Pod dry, flattened at right angles to the partition, 4-seeded.

1. **S. vulgaris, L.** Common Lilac. A strong-growing, hardy bush. Leaves ovate, somewhat heart-shaped. Flowers sweet-scented, in very close, large clusters, lilac or white. Corolla-lobes concave. Very commonly cultivated from Eastern Europe.

2. **S. persica, L.** Persian Lilac. A more slender and less branched shrub than No. 1. Leaves lance-ovate, somewhat narrowed or tapering at the base. Flowers in rather loose clusters, not very sweet-scented, pale lilac or white. Corolla-lobes ovate, somewhat bent inward. Pods linear. Cultivated from Western Asia, less common than No. 1.

IV. CHIONANTHUS, L.

Shrubs or small trees. Leaves simple, opposite, entire, petioled, deciduous. Flowers in panicles borne on wood of the previous season. Calyx small, 4-cleft, persistent. Corolla

wheel-shaped, 4-parted, the lobes long and linear. Stamens 2–4, included, inserted on the base of the corolla. Style short; stigma 2-lobed. Fruit a 1-seeded stone-fruit.*

1. **C. virginica, L.** FRINGE-TREE. A small tree, with smooth, light gray bark and spreading branches. Leaves oval to oblong, acute or obtuse at each end, smooth or slightly downy. Panicles large and loose, leafy-bracted, appearing with the leaves. Flowers on slender, drooping pedicels. Petals 1 in. or more in length. Fruit ovoid, purple, ½–¾ in. long. Along streams, usually on light soil.*

V. LIGUSTRUM, Tourn.

Shrubs. Leaves simple, opposite, entire, deciduous or sometimes persistent. Flowers in terminal panicles or similar clusters, white, small. Calyx minutely 4-toothed or truncate. Corolla funnel-form, 4-lobed. Stamens 2, short, inserted in the tube of the corolla. Ovary free, 2-celled, 2 ovules in each cell, style short. Fruit a 1–4-seeded, globose berry.*

1. **L. vulgare, L.** PRIVET. A branching shrub, 4–10 ft. high; branches long and slender. Leaves somewhat leathery, lanceolate to obovate, short-petioled, tardily deciduous. Panicles dense, minutely downy. Flowers ¼ in. wide, fragrant. Stamens included. Berries black. Introduced from Europe and used largely for hedges.*

79. GENTIANACEÆ. GENTIAN FAMILY.

Annual or perennial herbs. Leaves entire, usually opposite, sometimes alternate, without stipules. Flowers regular, solitary or in cymes. Calyx free from the ovary, 4–8-toothed or lobed. Corolla hypogynous, wheel-, bell-, or funnel-shaped, 4–8-lobed. Stamens 4–8, inserted on the corolla-tube; filaments thread-shaped; anthers facing inwards. Ovary 1–2-celled; ovules many, on 2 opposite placentas. Capsule 1-celled or partially 2-celled, 2-valved, many-seeded.

I. OBOLARIA, L.

A low, smooth, purplish-green perennial. Flowers axillary and terminal. Calyx of 2 distinct, spatulate, bract-like sepals.

Corolla tubular-bell-shaped, 4-lobed. Stamens short, inserted at the notches of the corolla. Style short; stigma 2-lipped. Capsule ovoid, more or less 2–4-celled; seeds very minute and numerous.

1. **O. virginica, L.** PENNYWORT. Stem 3–8 in. high, often several from the same root. Leaves somewhat fleshy, wedge-obovate or somewhat diamond-shaped, often truncate, sessile. Flowers opposite or terminal in threes, nearly sessile. Corolla pale purple or nearly white. Rich woodlands, among dead leaves.

II. MENYANTHES, Tourn.

Perennial, scape-bearing marsh herbs. Rootstock creeping. Leaves of 3 leaflets. Flowers racemed. Calyx 5-parted. Corolla fleshy, funnel-shaped, the limb 5-parted. Stamens 5, inserted on the corolla-tube. Disk of 5 hypogynous glands. Ovary 1-celled; style thread-shaped; stigma 2-lobed. Capsule globose, many-seeded.

1. **M. trifoliata, L.** BUCK-BEAN, MARSH TREFOIL. Rootstocks stout and matted. Leaflets obtuse, entire. Flowers ¾ in. in diameter, white or pinkish. Bogs, especially N.

80. APOCYNACEÆ. DOGBANE FAMILY.

Trees, shrubs, or herbs, with milky juice, often climbing. Leaves usually opposite, rarely whorled; entire, nearly or quite without stipules. Flowers regular, solitary, or in cymes. Calyx 4–5-cleft. Corolla hypogynous, funnel-, salver-, or bell-shaped, sometimes with scales in the throat. Stamens, 4–5, borne on the corolla-tube or throat; filaments very short; anthers somewhat attached to the stigma. Ovary of 2 carpels, free or somewhat united; style short; stigma entire or 2-cleft. Fruit of 2 many-seeded pods (in the genera here described).

I. AMSONIA, Walt.

Perennial herbs; stem erect, branched. Leaves alternate. Flowers in terminal panicles. Calyx small, 5-parted. Corolla

small, pale blue, funnel or salver form, downy within. Stamens inserted above the middle of the tube, included. Ovary of 2 carpels, united at the top by the slender style; stigma globose, surrounded by a cup-shaped appendage. Fruit 2 slender, erect, many-seeded follicles; seeds without tufts of hairs.*

1. **A. tabernæmontana, Walt.** AMSONIA. Stem smooth and glabrous, branched above, 2–3 ft. high. Leaves lanceolate, entire, acuminate at the apex, acute at the base, smooth above, with a bloom or slightly downy beneath, short-petioled. Flowers numerous, on bracted pedicels. Corolla-tube slender, smooth or sometimes downy above, the lobes narrow, as long as the tube. Follicles slender, spreading, 4–6 in. long; seeds downy. Swamps and wet ground S.*

II. VINCA, L.

Perennial herbs or small, slender shrubs; juice not perceptibly milky. Leaves evergreen. Flowers solitary, white, blue, or purple. Calyx 5-parted, lobes taper-pointed, glandular inside at the base. Corolla salver-shaped, thickened at the throat, 5-lobed. Stamens 5, inserted on the upper or middle part of the corolla-tube. Ovary of 2 carpels. Pods 2, slender, cylindrical, many-seeded.

1. **V. minor, L.** PERIWINKLE. Stem slender, trailing, often rooting at the nodes, 1–3 ft. long. Leaves ovate, acute at the apex, short-petioled, bright green. Flowers axillary, solitary, 1 in. wide. Calyx with linear lobes nearly as long as the inflated tube of the blue corolla. Matured pods slender, slightly divergent. Introduced from Europe and common in gardens.*

III. APOCYNUM, Tourn.

Perennial herbs; stems with very tough bark, branched above. Leaves opposite, entire. Flowers in terminal and axillary bracted cymes. Calyx small, 5-parted, lobes acute. Corolla bell-shaped, 5-lobed, with a small, scale-like appendage at the base of each lobe. Stamens 5, distinct, inserted on the base of the corolla-tube. Ovaries 2, distinct, united by the styles; stigma obtuse, 2-lobed. Pods long, slender, many-seeded; seeds with a tuft of hairs.*

1. **A. cannabinum, L.** INDIAN HEMP. Stem erect, smooth, with numerous erect or ascending branches. Leaves oval to oblong, mucronate at the apex, rounded at the base, downy beneath, short-petioled. Cymes terminal, compact, shorter than the leaves. Flowers are on short, bracted pedicels, greenish-white, about ¼ in. broad. Calyx-lobes lanceolate, nearly as long as the tube of the corolla. Corolla-lobes erect. Pods very slender, tapering, 3–4 in. long. Along fences and in thickets.*

2. **A. androsæmifolium, L.** DOGBANE. Plant 2–3 ft. high, usually smooth, purplish, the branches spreading and forking. Leaves 2–3 in. long, acute, mucronate, petioles about ¼ in. long. Cymes mostly terminal, few-flowered. Calyx-teeth lance-ovate, about half as long as the corolla-tube. Corolla pale red or whitish, its lobes recurved. Pods stouter than in No. 1. Roadsides and clearings, common.

IV. NERIUM, L.

Shrubs. Leaves mostly whorled in threes. Flowers in terminal cymes. Calyx small, lobes acute. Corolla salver-form, the throat of the tube crowned with cleft or cut-fringed scales. Stamens 5, short, included; anthers tipped with a hairy bristle. Ovary of 2 carpels; style short. Pods erect, seeds with a tuft of hairs.*

1. **N. Oleander, L.** OLEANDER. Stem erect, diffusely branched from below, 4–10 ft. high. Leaves narrowly elliptical, acute at each end, thick and leathery, short-petioled. Flowers showy, in large clusters, red or white, often double; scales of the crown 3–4-pointed unequal teeth; pods spindle-shaped, 3–4 in. long. Introduced from Palestine, common in cultivation.*

81. ASCLEPIADACEÆ. MILKWEED FAMILY.

Shrubs or herbs, often twining; juice usually milky. Leaves generally opposite or whorled, entire, without stipules. Flowers regular. Calyx 5-parted. Corolla 5-parted. Stamens 5; the filaments usually cohering around the styles, often with hood-like appendages, each with an incurved horn borne on the stamen-tube and forming a crown around the stigma (Fig. 20, *A*); anthers pressing against the lobes of the stigma; the pollen clinging together in tough, waxy or fine-

grained masses. Ovary free from the calyx-tube, of 2 carpels, more or less united below but unconnected above; styles 2; stigmas 5-angled; ovules several–many. Fruit consisting of 1 or 2 pods. The flowers are very highly specialized for pollination by insects (see below, under *Asclepias*).

I. ASCLEPIAS, L.

Perennial herbs. Flowers in simple (usually many-flowered) umbels. Calyx small, 5-parted, its lobes reflexed. Corolla deeply 5-parted, with reflexed lobes; crown of hoods and horns conspicuous (Fig. 20, *A*, *B*). Stamens with their filaments united into a tube around the pistil and anthers adnate to the stigma (Fig. 20, *D*, *E*); anther-cells 2, each cell containing an elongated, pear-shaped, tough mass of pollen, a mass from one anther always paired with one from the adjoining anther and each two together suspended from one of the 5 split glands on the angles of the stigma (Fig. 20, *D*, *E*). Ovaries 2; styles very short. Pods 2 or sometimes 1 and the other undeveloped. Seeds flat, each with a tuft of long, silky hairs. The flowers are pollinated by insects, which get their feet entangled in the clefts of the glands (Fig. 20, *g*) and then carry off the pollen-masses. (See Müller, *The Fertilization of Flowers*, pp. 396–399 inclusive.)

1. **A. purpurascens, L.** Purple Milkweed. Stem 1–3 ft. high, somewhat branched above. Leaves 4–6 in. long, elliptical or nearly so, the upper ones taper-pointed, slightly velvety beneath, short-petioled. Umbels terminal. Flowers ½ in. long, dark purple; pedicels shorter than the peduncle; horn broadly scythe-shaped, with the point bent sharply inward. Dry soil.

2. **A. Cornuti, Decaisne.** Common Milkweed. Stem stout, 3–4 ft. high, finely downy. Leaves 4–8 in. long, oblong or nearly so, downy beneath. Umbels terminal or nearly so. Flowers varying from purple or greenish-purple to whitish, numerous, with a strong, sweet, but sickening odor. Hoods with a tooth on each side of the stout horn. Common in rich soil.

3. **A. phytolaccoides, Pursh.** Poke-leaved Milkweed. Stem rather slender, 3–5 ft. high. Leaves 6–9 in. long, ovate or oval-lanceolate, taper-pointed, short-petioled. Umbels several, mostly lateral; pedicels slender and drooping. Lobes of the corolla

greenish; hoods white, with 2 teeth; horns with an awl-shaped point extending far out of the hoods. · Damp thickets N. and E.

4. **A. variegata, L.** WHITE MILKWEED. Stem stout, leafless and smooth below, leafy and downy in lines above. Leaves opposite, the middle ones sometimes in fours, petioled, ovate to obovate,

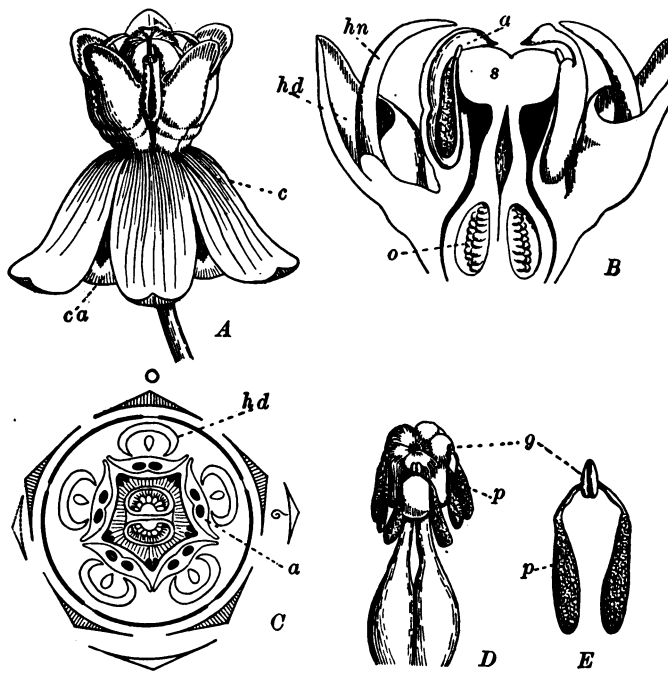


FIG. 20. — Flower of *Asclepias Cornuti*.

A, entire flower; *B*, vertical section; *C*, diagram; *D*, details of pollen-masses and glands. *ca*, calyx; *c*, corolla; *hd*, hood; *hn*, horn; *a*, anther; *s*, stigma; *o*, ovary; *g*, gland; *p*, pollen-mass. (All considerably enlarged.)

cuspidate, smooth on both sides, pale beneath, edges slightly crenate. Umbels 1–5, compact, downy, 1–2 in. long; pedicels erect, as long as the peduncles. Corolla white, often purple at the base; hoods roundish, spreading, a little longer than the thick, awl-pointed, incurved horn. Dry, open woods E. and S.*

5. **A. quadrifolia, L.** FOUR-LEAVED MILKWEED. Stem slender, 1½–2 ft. or more high, usually leafless below. Leaves in 1 or 2

whorls of 4 each, near the middle of the stem, and a pair or two opposite, thin, slender-petioled, 2–4 in. long, ovate-lanceolate, taper-pointed. Umbels usually 2, sometimes 1, with slender pedicels. Corolla-lobes very pale pink or whitish; hoods white; horn short, stout, and bent inward. Dry woods and fence-rows.

II. HOYA, R. Br.

Shrubby, more or less climbing, smooth, tropical plants. Leaves fleshy. Calyx 5-cleft, corolla 5-lobed, wheel-shaped, its divisions thick and with a waxy look. Crown of 5 spreading segments. Pollen-masses fastened by the bases.

1. **H. carnosa, R. Br.** WAX PLANT. Stems long and slender, rooting and trailing. Leaves oval or nearly so, thick, dark green. Flowers in close umbels, pink or whitish, the corolla-lobes covered on the upper surface with minute projections. Cultivated from India as a house plant and in conservatories.

82. CONVOLVULACEÆ. MORNING-GLORY FAMILY.

Usually twining herbs or shrubs, often with milky juice. Leaves alternate (wanting in *Cuscuta*), without stipules. Flowers variously clustered, rarely solitary, often large and showy. Sepals 5. Corolla hypogynous, regular, tubular, bell-shaped or funnel-shaped; its limb more or less 5-lobed or angled. Stamens 5, inserted on the corolla-tube. Ovary usually 2–4-celled; style slender, 2–4-cleft; ovules 1 or 2 in each cell. Capsule 1–4-celled, 2–4-valved or bursting open across the base.

I. CALYSTEGIA, R. Br.

Twining, trailing, or nearly erect perennials. Leaves heart-shaped or arrow-shaped. Flowers peduncled, axillary and solitary. Calyx enclosed in 2 large, leaf-like, usually heart-shaped bracts; sepals equal. Corolla bell-funnel-shaped, its border nearly or quite entire; style 1; stigmas 2. Pod 1-celled or partially 2-celled, 4-seeded.

1. **C. sepium, R. Br.** CREEPERS, RUTLAND BEAUTY. Stem twining or sometimes extensively trailing. Leaves heart-arrow-

shaped or somewhat halberd-shaped, the lobes at the base truncate. Flowers numerous and showy, white or tinged with rose-color. Thickets and banks of streams, often cultivated.

2. **C. spithamæa, Pursh.** Downy, stem 6–12 in. high, erect or reclining. Leaves oblong, sometimes heart-shaped or eared at the base. Flowers white. In sandy soil.

II. CONVOLVULUS, L.

Herbs or shrubs, with stems twining or nearly erect. Calyx not bracted. Corolla broadly funnel-form or bell-shaped. Stamens not projecting from the corolla. Style 1; stigmas 2, thread-like; ovary and pod 2-celled, 4-seeded.

1. **C. arvensis, L.** BINDWEED. A perennial, prostrate or climbing herb, with many stems, from a long, slender rootstock. Leaves very variable, more or less arrow-shaped, 1–3 in. long. Peduncles mostly 1-flowered; flowers white or pinkish, about $\frac{3}{4}$ in. long. A weed in fields E.; introduced from Europe.

III. QUAMOCLIT, Tourn.

Twining annual herbs. Sepals 5, mostly mucronate or bristle-pointed. Corolla tubular, with a narrow, spreading border. Stamens projecting. Style 1; stigma knobbed, 2-lobed. Pod 4-celled, the cells 1-seeded.

1. **Q. vulgaris, Choisy.** CYPRESS VINE. Stem slender, smooth, twining high. Leaves dark green, pinnately cut, the divisions linear, smooth. Peduncles slender, as long as the leaves, 1–5-flowered; pedicels thickened upward. Sepals ovate or oblong, mucronate. Corolla bright scarlet, or sometimes yellowish-white, salver-form, the tube 1–1$\frac{1}{2}$ in. long, the limb flat and spreading, $\frac{1}{2}$–$\frac{3}{4}$ in. wide. Capsule ovoid, twice the length of the sepals. Common in gardens.*

IV. IMPOMŒA, L.

Annuals or perennials; stems often twining. Flowers showy. Calyx not bracted at the base, of 5 sepals. Corolla bell-shaped or funnel-shaped, twisted in the bud. Stamens not projecting from the corolla. Style slender; stigma knobbed, 2-lobed. Fruit a 2–3-celled capsule. [*I. purpurea*, the common morning-glory, blossoms too late for school study. *I. Batatas*, the sweet potato, seldom flowers.]

1. **I. hederacea, Jacq.** WILD MORNING-GLORY. Stems hairy, twining. Leaves heart-shaped, 3-lobed. Peduncles 1–3-flowered. Calyx very hairy below. Corolla showy, bluish-purple or white. Pod usually 3-celled, with 2 seeds in each cell. A weed in fields and about dwellings; introduced from tropical America.

2. **I. pandurata, Meyer.** WILD POTATO VINE. Perennial, from a very large, tuberous root; stem trailing or twining, smooth or slightly downy, 5–10 ft. long. Leaves broadly heart-shaped, with the apex slender and obtuse, sometimes fiddle-shaped or 3-lobed; petioles slender. Peduncles longer than the petioles, 1–5-flowered. Sepals oblong, obtuse, smooth, mucronate, the 2 outer ones shorter. Corolla white with a purple throat, 2–3 in. wide, lobes pointed. Capsule globose, 2–3-seeded, the seeds woolly on the angles. On dry or damp, sandy soil, along fences, railroad embankments, etc., common S. and W.*

83. POLEMONIACEÆ. PHLOX FAMILY.

Annual or perennial herbs, rarely shrubs. Leaves alternate or the lower opposite, without stipules. Flowers in terminal, forking cymes. Calyx free from the ovary, 5-lobed. Corolla regular or nearly so, 5-parted. Stamens 5, inserted on the corolla-tube, usually unequal. Ovary 3-celled; style simple; stigmas 3, linear; capsule 3-celled, the cells 1–many-seeded.

I. PHLOX, L.

Perennial or rarely annual herbs; stems erect or diffuse. Leaves opposite, or the upper alternate, entire, without stipules. Flowers showy, white or purple, in terminal cymes or panicles. Calyx cylindrical or funnel-form, 5-cleft, the lobes acute. Corolla salver-form, the tube long and slender, the limb 5-parted, the lobes spreading, entire or obcordate. Stamens included, unequal. Ovary 3-celled, style slender. Capsule ovoid, 3-celled, 1–few-seeded; seeds wingless or narrow-winged.*

1. **P. paniculata, L.** GARDEN PHLOX. Perennial; stems in clumps, stout, erect, simple or branched above, 2–4 ft. high. Leaves ovate-lanceolate to oblong, taper-pointed at the apex, rounded or cordate at the base, thin, smooth, veins prominent beneath. Cymes numerous and compact, forming a pyramidal panicle; pedicels short.

Calyx-teeth long, bristle-pointed. Corolla purple to white, lobes round-obovate, shorter than the tube. Capsule longer than the calyx-tube. In rich woods; often cultivated.*

2. **P. maculata, L.** WILD SWEET WILLIAM. Stem erect, smooth or nearly so, rather slender, purple-spotted, 1–2 ft. high. Lower leaves lanceolate, the upper ones broader, taper-pointed, roundish or heart-shaped at the base. Panicle many-flowered, narrow, ellipsoidal. Calyx-teeth lanceolate, hardly acute. Flowers purple, occasionally white. Damp woods and fields.

3. **P. pilosa, L.** DOWNY PHLOX. Perennial; stem erect, slender, simple or branched, 1–2 ft. high. Leaves linear-lanceolate to linear, distant, spreading, long, taper-pointed, sessile; stem and leaves downy. Cymes corymbose, loose. Flowers short-pediceled. Calyx glandular-viscid, the teeth shorter than the tube of the purple corolla, bristle-pointed. Corolla-tube downy, lobes obovate. Capsule twice the length of the calyx-tube. In dry, open woods.*

4. **P. divaricata, L.** WILD BLUE PHLOX. Perennial; stems erect or ascending from a decumbent base, sticky-downy, 1 ft. high. Leaves distant, lanceolate to oblong, acute at the apex, rounded at the base, sessile, downy. Cymes corymbed, loosely flowered. Calyx-teeth awl-shaped, longer than the tube. Corolla bluish-purple, $\frac{1}{2}$–$\frac{3}{4}$ in. long, lobes notched at the apex, as long as the tube. Capsule oval, shorter than the calyx-teeth. In moist, open woods.*

5. **P. Drummondii, Hook.** DRUMMOND'S PHLOX. Annual; stem erect or ascending, slender, weak, branching, glandular-downy, 6–12 in. high. Leaves mostly alternate, lanceolate to oblong, downy, the upper clasping by a heart-shaped base. Corymbs loose. Flowers rather long-pediceled. Calyx-tube short, the teeth lanceolate, bristle-pointed, soon recurved. Corolla purple to crimson or white, orifice of the tube usually with a white or yellowish star-like ring, lobes rounded at the apex. Ovary 3-seeded, angles of the seeds winged. Introduced from Texas and common everywhere in gardens.*

6. **P. subulata, L.** GROUND PINK, MOSS PINK, FLOWERING MOSS. Stems perennial, prostrate, 8–18 in. long, with many short, somewhat upright branches, 2–4 in. high. Leaves linear-awl-shaped, stiff, about $\frac{1}{2}$ in. long, crowded, with clusters of smaller ones in their axils. Flower-clusters 3–6-flowered. Corolla pink-purple, with a darker center, or sometimes white. Forms dense mats on rocky or sandy hillsides. S. and W. and often cultivated.

II. POLEMONIUM, L.

Perennial herbs. Leaves alternate, pinnate. Flowers corymbed. Calyx bell-shaped, 5-lobed. Corolla wheel-shaped, the limb with 5 obovate lobes. Stamens borne on the throat of

the corolla, the filaments enlarged and hairy below. Capsule ovoid, 3-celled, many-seeded.

1. **P. reptans, L.** JACOB'S LADDER, BLUE VALERIAN, BLUEBELL. Stems smooth, branched, and leaning over, 6–12 in. high. Leaflets usually 7 or 9, about an inch long. Corolla blue, about 3 times as long as the calyx. Capsule 3-seeded, borne on a short stalk in the persistent calyx. Damp, open woods, sometimes cultivated.

84. HYDROPHYLLACEÆ. WATERLEAF FAMILY.

Herbs, usually hairy. Leaves commonly alternate and alternate-lobed. Flowers with their parts in fives, in appearance not unlike those of the following family, in one-sided cymes, which are coiled up at first. Calyx free from the ovary, usually with appendages at the notches. Corolla often with scales or nectar-bearing folds inside. Stamens borne by the corolla-tube. Style 2-cleft, or styles 2. Ovary entire and usually 1-celled. Fruit a capsule, 2-valved, 4–many-seeded.

I. HYDROPHYLLUM, Tourn.

Coarse perennials. Leaves large, petioled. Flowers white or pale blue, inconspicuous. Calyx 5-parted, sometimes appendaged at the notches. Corolla bell-shaped, 5-cleft, with 5 double, nectar-bearing folds inside. Stamens projecting, the filaments bearded. Style projecting; ovary covered with bristly hairs, the placentæ very broad and fleshy, enclosing the ovules. Capsule globular, 1–4-seeded.

1. **H. macrophyllum, Nutt.** A coarse, rough-hairy plant, about 1 ft. high, from scaly-toothed rootstocks. Leaves oblong, pinnate and pinnately cut, the divisions mucronate, obtuse, coarsely toothed. Flower-cluster dense, globular, long-peduncled. Flowers about $\frac{1}{2}$ in. long. Calyx little or not at all appendaged, its lobes broad at the base, but with slender, tapering points. Corolla white. Rich, rocky woods W. and S.

2. **H. virginicum, L.** Nearly smooth, 1–2 ft. high, stem often forking at the base. Leaves of the stem mostly near the top, pinnately cut into 5–7 divisions; lobes oval-lanceolate, deeply serrate, the lowest

ones distinct; petioles of the radical and lower leaves 4–8 in. long. Flower-clusters on peduncles longer than the petioles of the upper leaves, from the axils of which or opposite which they arise. Flowers about ¼ in. long. Calyx not appendaged, its lobes narrowly linear, bristly-margined. Corolla whitish, with purplish veins. Moist woods.

3. **H. appendiculatum, Michx.** Hairy, 1–1½ ft. high. Stem-leaves palmately 5-lobed, the lobes acute, toothed, lowest ones pinnately divided. Flower-cluster rather loose. Calyx appendaged at the notches. Corolla blue. Stamens projecting from the corolla little or not at all. Moist woods.

II. PHACELIA, L.

Herbs, mostly annual. Leaves alternate, sometimes simple, but in most species lobed or divided. Flowers in one-sided clusters, often showy. Calyx 5-parted, without appendages. Corolla with 5 spreading lobes. Ovary 1-celled, with narrow placentæ.

1. **P. tanacetifolia, Benth.** A tall, hairy annual. Leaves pinnately cut. Spikes long, densely flowered. Flowers showy, blue. Stamens projecting. Capsule 4-seeded. Cultivated from California.

2. **P. Whitlavia, Gray.** WHITLAVIA. A rather coarse, sticky annual. Leaves broad, ovate, coarsely toothed, petioled. Flower-clusters a loose raceme. Flowers showy, about 1 in. long, blue or sometimes white. Corolla bell-shaped. Stamens and style projecting. Capsule many-seeded. Cultivated from California.

3. **P. Menziesii, Torr.** EUTOCA. A much-branched, somewhat rough or rough-hairy plant, 3–12 in. high. Leaves linear, or lanceolate, entire or nearly so. Flowers showy, violet or white, loosely panicled. Capsule many-seeded. Cultivated from California.

85. BORRAGINACEÆ. BORAGE FAMILY.

Mostly herbs, with stems and foliage roughened with stiff hairs. Leaves alternate and entire, not aromatic. Flowers generally in a coiled inflorescence. Calyx 5-parted. Corolla hypogynous, generally 5-lobed and regular. Stamens 5, inserted on the corolla-tube. Style 1; ovary commonly 4-lobed, ripening into 4 1-seeded nutlets.

I. HELIOTROPIUM, Tourn.

Herbs or low shrubs. Leaves petioled. Flowers white, blue, or lilac, in one-sided, curved spikes. Calyx 5-parted. Corolla salver-shaped, the throat open. Anthers almost sessile. Style short; stigma conical or knobbed. Fruit separating into 2 or 4 nutlets.

1. **H. peruvianum, L.** COMMON HELIOTROPE. Somewhat shrubby, much branched. Leaves lance-ovate or somewhat oblong, veined and much wrinkled, short-petioled. Flowers numerous, in a cluster of terminal spikes, bluish-purple or lavender, very sweet-scented, the odor not unlike that of vanilla. Cultivated from Peru.

II. CYNOGLOSSUM, Tourn.

Coarse, rough-hairy or silky biennials. Flowers small, bluish-purple or white, in forked and usually bractless cymes. Calyx 5-parted. Corolla funnel-shaped, the mouth closed by prominent scales, its lobes obtuse. Stamens not projecting. Styles stiff, persistent. Nutlets 4, covered with hooked or barbed bristles, attached to a thickened, conical receptacle.

1. **C. officinale, L.** HOUND'S-TONGUE, SHEEP-LICE, DOG-BUR, STICK-TIGHTS. Stem 1–2 ft. high, soft-downy, panicled above. Root-leaves 8–10 in. long, long-petioled, oblong or oblong-lanceolate; stem-leaves sessile, linear-oblong or lanceolate, rounded or heart-shaped at the base. Corolla $\frac{1}{2}$ in. in diameter, reddish-purple. Nutlets $\frac{1}{4}$ in. long, with a thickened border. Whole plant with a strong smell like that of mice. A troublesome weed, along roadsides and in pastures, introduced from Europe.

2. **C. virginicum, L.** WILD COMFREY. Perennial. Stem stout, simple, erect, leafless above, 2–3 ft. high. Leaves oval or oblong, the upper clasping by a heart-shaped base. Racemes bractless. Flowers pale blue, on short pedicels, which are recurved in fruit. Nutlets not margined, separating and falling away at maturity. On dry soil.

III. ECHINOSPERMUM, Lehm.

Annual or biennial herbs, grayish, with rough hairs. Flowers small, blue or whitish, racemed or spiked. Corolla salver-shaped, its throat closed with 5 concave scales. Nutlets

more or less covered with prickles, which are barbed at the tip, attached by their sides to the base of the style.

1. **E. virginicum, Lehm.** BEGGAR'S LICE. A coarse biennial, 2–4 ft. high, the stem much branched above. Root-leaves roundish-ovate or heart-shaped, on slender petioles; stem-leaves 3–4 in. long, pointed at both ends. Racemes 1–3 in. long, terminating the slender, spreading branches. Flowers small, bluish-white. Fruit forming a troublesome bur. Fence-rows and thickets.

IV. MERTENSIA, Roth.

Perennial herbs. Leaves generally pale, smooth, and entire. Calyx short, deeply 5-cleft or 5-parted. Corolla somewhat trumpet-shaped or funnel-shaped, often with 5 small folds or ridges in the throat, between the points of insertion of the stamens. Style long and slender. Nutlets smooth, or at length becoming wrinkled.

1. **M. virginica, DC.** LUNGWORT, BLUEBELLS. Smooth, nearly erect, 1–1½ ft. high. Root-leaves large, obovate, or nearly so, and petioled; stem-leaves smaller, sessile. Flowers clustered. Corolla nearly trumpet-shaped, varying with age from lilac to blue (or occasionally white). Stamens with slender filaments projecting beyond the corolla-tube. Damp, open woods and banks of streams, sometimes cultivated.

V. MYOSOTIS, Dill.

Low, annual, biennial, or perennial herbs; stems branching, erect or diffuse. Leaves alternate, entire. Flowers small, blue, pink, or white, in elongated, bractless racemes. Calyx 5-cleft, the lobes erect or spreading in fruit. Corolla salver-form, 5-lobed, the tube as long as the calyx, the throat with 5 small appendages. Stamens 5, inserted in the tube of the corolla, included. Ovary 4-parted; style slender. Nutlets smooth or downy, elliptical, compressed.*

1. **M. palustris, Withering.** FORGET-ME-NOT. Perennial, from slender rootstocks. Stems slender, downy, rooting at the nodes, 6–15 in. long; leaves oblong to oblong-lanceolate, obtuse, narrowed to the sessile base, appressed-downy. Racemes many-flowered; pedicels becoming elongated in fruit. Lobes of the calyx shorter than the tube, spreading in fruit. Corolla blue with a yellow eye; nutlets angled, smooth. Common in gardens and often naturalized.*

2. **M. laxa, Lehm.** SMALL FORGET-ME-NOT. Annual or perennial; whole plant downy; stem slender, weak, decumbent and rooting at the base, 1–2 ft. long. Lower leaves spatulate, the upper lanceolate. Racemes loosely flowered, becoming elongated in fruit. Pedicels spreading. Calyx rough-hairy, the lobes as long as the tube. Corolla pale blue, with a yellow eye. Nutlets convex on all sides. On low ground and in brooks and ponds.*

VI. LITHOSPERMUM, Tourn.

Herbs, with stout, usually reddish roots. Flowers appearing axillary and solitary or else in leafy-bracted spikes. Corolla funnel-shaped or salver-shaped, with or without folds or appendages at the mouth of the tube; the limb 5-cleft, its divisions rounded. Stamens included in the corolla-tube, the anthers nearly sessile. Nutlets either smooth or wrinkled, generally very hard and bony.

1. **L. arvense, L.** CORN GROMWELL. A rough weed, about 1 ft. high. Leaves narrowly lanceolate. Flowers inconspicuous, whitish in the upper leaf axils. Corolla hardly extending beyond the calyx, without appendages in the throat. Nutlets rough or wrinkled and dull. Sandy banks and roadsides; introduced from Europe.

2. **L. hirtum, Lehm.** HAIRY PUCCOON. Rough-hairy, perennial, 1–2 ft. high. Corolla deep orange-yellow, with appendages in the throat and clad with wool within at the bottom; flowers handsome, peduncled, in a crowded cluster. Dry, open pine woods, in sandy soil.

3. **L. canescens, Lehm.** PUCCOON, INDIAN PAINT. Perennial. Clothed with soft hairs, 8–12 in. high. Flowers axillary and sessile. Corolla appendaged, not woolly within, showy, orange-yellow. Banks and open woods.

VII. ECHIUM, Tourn.

Herbs or sometimes shrubs, usually stout, coarse, and hairy. Leaves entire. Flowers white, reddish-purple or blue, in spiked or panicled racemes. Calyx 5-parted. Corolla-tube cylindrical or funnel-shaped; the throat dilated; the limb with 5 unequal lobes. Filaments unequal, adnate to the corolla below, projecting from the corolla. Style thread-like, stigma 2-lobed. Nutlets 4, ovoid or top-shaped, wrinkled.

1. **E. vulgare, L.** BLUE THISTLE, BLUE WEED, BLUE DEVILS. Stems 1–3 ft. high, more or less erect, leafy, covered with stinging

hairs. Root-leaves lanceolate or oblong, petioled, 4–8 in. long; stem-leaves sessile, acute, rounded at the base. Flowers showy, reddish-purple in the bud, changing to bright blue. A very troublesome weed, especially in fallow fields. Introduced from Europe.

86. VERBENACEÆ. Verbena Family.

Herbs, shrubs, or trees. Leaves opposite or whorled, without stipules. Flowers irregular, in bracted cymes. Calyx free from the ovary, cleft or toothed. Corolla free from the ovary, tubular, usually more or less 2-lipped. Stamens usually 4, 2 long and 2 short, inserted on the corolla-tube. Ovary usually 2–4-celled (in *Phryma* 1-celled), with the style springing from its summit.

I. VERBENA, Tourn.

Annual or perennial herbs. Leaves simple, opposite, serrate or pinnately lobed. Flowers in terminal spikes which become much elongated in fruit. Calyx tubular, 5-ribbed, 5-toothed. Corolla salver-form or funnel-form, the tube often curved, bearded in the throat, limb spreading, 5-lobed, often somewhat 2-lipped. Stamens 4, 2 long and 2 short, rarely only 2, included. Ovary 2–4-celled, 2–4-ovuled; style slender, 2-lobed. Fruit 2–4 smooth or roughened, 1-seeded nutlets. [Several of the commonest species are tall, coarse herbs which blossom too late for school study.]*

1. **V. officinalis, L.** European Vervain. Annual; stem erect, slender, nearly or quite smooth, branching, 1–3 ft. high. Leaves ovate to obovate in outline, pinnately lobed or divided, narrowed and entire toward the base, downy beneath; petioles margined. Spikes several, very slender; flowers small, purple, bracts shorter than the calyx. In fields and waste places; introduced from Europe.*

2. **V. angustifolia, Michx.** Narrow-leaved Vervain. Perennial, rough-hairy; stem simple, or branched below, from a creeping base, 1–2 ft. high. Leaves lanceolate to spatulate, obtuse and toothed at the apex, tapering to a sessile base. Spike peduncled, slender, close-flowered; bracts about the length of the calyx. Corolla purple, tube slightly curved, ¼ in. long. In dry, open woods.*

3. **V. Aubletia, L.** VERBENA. A slender-stemmed, somewhat reclining annual, 1 ft. or less in height. Leaves ovate or nearly so, wedge-shaped at the base, lobed and toothed or 3-cleft. Flowers showy, reddish-purple or lilac (seldom white), in a peduncled spike. Calyx-teeth as long as or longer than the bracts. Corolla very slightly bearded in the throat. In dry prairie soil and open woods, also cultivated. [Other somewhat similar cultivated species are from Brazil.]

II. CALLICARPA, L.

Shrubs. Leaves simple, petioled, opposite or whorled, glandular-dotted. Flowers in axillary cymes. Calyx 4-toothed or entire. Corolla funnel-form, 4-cleft, regular; stamens 4, equal, projecting. Ovary 4-ovuled; style slender; stigma knobbed. Fruit a 1–4-seeded berry.*

1. **C. americana, L.** FRENCH MULBERRY, MEXICAN MULBERRY. Shrubs, with star-shaped, glandular or scurfy down, widely branched, 3–8 ft. high. Leaves ovate to oblong, acute at each end, crenate-serrate, rough above, downy beneath, glandular-dotted; petioles slender. Cymes many-flowered, the peduncle as long as the petiole, pedicels short. Calyx cup-shaped, the teeth short. Corolla double the length of the calyx, blue. Fruit violet-purple, very conspicuous in autumn. Common in fields and thickets S.*

87. LABIATÆ. MINT FAMILY.

Mostly herbs, with square stems and opposite, more or less aromatic leaves, without stipules. Flowers generally in cyme-like axillary clusters, which are often grouped into terminal spikes or racemes. Calyx tubular, usually 2-lipped, persistent. Corolla usually 2-lipped (Fig. 148). Stamens 4 (2 long and 2 short) or only 2. Ovary free, with 4 deep lobes, which surround the base of the style. Fruit consisting of 4 nutlets, ripening inside the base of the calyx.

Stamens 4. A.

(*a*) Calyx 2-lipped.

Lips entire. Scutellaria, I.

Lips toothed and cleft. Plants not aromatic. Brunella, IV.

Lips toothed and cleft. Plants aromatic. Leaves extremely small. Thymus, IX.

(*b*) Calyx not 2-lipped, or not much so.

Calyx tubular, 5–10-toothed. Stamens not projecting from tube of corolla. Marrubium, II.

Calyx tubular, with 5 equal teeth. Stamens under upper lip of corolla. Nepeta, III.

Calyx tubular, bell-shaped, with 5 awl-shaped teeth. Stamens not turned down after maturing. Lamium, V.

Calyx top-shaped, with spreading spiny teeth. Leonurus, VI.

Calyx as in No. 5. Stamens turned down after maturing. Stachys, VII.

B.

Stamens 2. Salvia, VIII.

I. SCUTELLARIA, L.

Mostly slender herbs, not aromatic. Flowers solitary or in pairs, axillary or in terminal spikes or racemes. Calyx bell-shaped, 2-lipped, the upper part swollen into a helmet-shaped pouch; mouth of the calyx closed after flowering. Corolla-tube long, naked inside. Stamens 4, the anthers meeting in pairs, hairy-fringed. Style with a very short upper lobe. [The species here described are not the commonest ones, but most of the others grow in damp soil and bloom later.]

1. **S. serrata, Andrews.** Skullcap. Stem not much branched, 1–3 ft. high. Stem-leaves serrate, taper-pointed at both ends, ovate or nearly so. Racemes single, loose. Calyx rather hairy. Corolla 1 in. long, the lips of equal length. Woods.

2. **S. pilosa, Michx.** Hairy Skullcap. Stem more or less hairy, not much if at all branched, 1–3 ft. high. Leaves a few distant pairs, diamond-ovate, oblong-ovate, or roundish-ovate, scalloped, obtuse, the lower heart-shaped or nearly truncate at the base, with long petioles. Racemes short, few-flowered. Corolla ½ in. long,

tube whitish, lips blue, the lower one rather shorter. Open woodlands and dry soil.

3. **S. integrifolia, L.** LARGE-FLOWERED SKULLCAP. Stem covered with fine, grayish down, usually unbranched, 1–2 ft. high. Leaves lance-oblong or nearly linear, mostly entire, obtuse, with very short petioles. Corolla 1 in. long, tube pale, lips large and spreading, blue. Dry ground.

II. MARRUBIUM, Tourn.

Perennial, downy, or woolly herbs. Whorls of flowers axillary; flowers small; bracts leaf-like. Calyx tubular, 5–10-toothed, teeth somewhat spiny. Corolla short; upper lip erect, lower spreading, 3-cleft, the middle lobe broadest. Stamens 4, not projecting. Lobes of the stigma short and blunt.

1. **M. vulgare, L.** HOREHOUND. Stems somewhat reclining, stout, branching, leafy, 1–1½ ft. high. Leaves broadly ovate, heart-shaped or wedge-shaped at the base, scalloped, leathery and wrinkled. Whorls of flowers dense. Calyx-teeth hooked at the tip. Corolla ¼ in. long, white. Cultivated from Europe as an herb (used in preparation of horehound candy) and somewhat naturalized.

III. NEPETA, L.

Erect or prostrate herbs. Whorls of flowers axillary or terminal; flowers blue or white. Calyx tubular, 15-ribbed, 5-toothed. Corolla-tube slender below, dilated at the throat, naked; upper lip notched or 2-cleft; lower lip 3-cleft, middle lobe large. Stamens 4, ascending under the upper lip, the upper pair longer. Lobes of the stigma awl-shaped.

1. **N. Cataria, L.** CATNIP. Stem grayish, downy, 2–3 ft. high, branched, very leafy. Leaves large, ovate-heart-shaped, deeply scalloped, serrate, white and downy beneath. Corolla about ½ in. long, whitish with purple dots. Introduced from Europe; a common weed about dooryards.

2. **N. Glechoma, Benth.** GROUND IVY, GILL-OVER-THE-GROUND, CREEPING CHARLEY, CROW-VICTUALS, ROBIN-RUNAWAY. Creeping. Leaves roundish, kidney-shaped, and crenate. Corolla bluish-purple, three times as long as the calyx. Introduced from Europe, common in damp places about houses and gardens.

IV. BRUNELLA, Tourn.

Perennials, with stems simple or nearly so, and sessile, 3-flowered flower-clusters in the axils of kidney-shaped bracts, the whole forming a spike or head. Calyx tubular-bell-shaped, somewhat 10-ribbed, upper lip broad, 3-toothed, the teeth short, lower lip with 2 longer teeth. Upper lip of the corolla upright, arched, and entire, the lower spreading, reflexed, fringed, and 3-cleft. Stamens 4, reaching up under the upper lip, with the tips of the filaments 2-toothed, only one tooth anther-bearing.

1. **B. vulgaris, L.** SELF-HEAL, HEAL-ALL, CARPENTER-WEED. Leaves with petioles, ovate-oblong, either entire or toothed, often somewhat hairy. Corolla usually blue or bluish, somewhat longer than the brown-purple calyx. Open woods and fields everywhere.

V. LAMIUM, L.

Annual or perennial hairy herbs. Calyx tubular-bell-shaped, 5-veined, with 5 awl-pointed teeth of nearly equal length. Corolla with dilated throat, upper lip arched, middle lobe of the lower lip notched, the lateral lobes small, close to the throat of the corolla. Stamens 4, rising beneath the upper lip.

1. **L. amplexicaule, L.** HEN-BIT, DEAD NETTLE. An annual or biennial weed. Leaves roundish, deeply scalloped, the lower ones petioled, the upper sessile and clasping. Corolla sometimes $\frac{3}{4}$ in. long, downy, rose-colored or purplish. Introduced from Europe; not uncommon about gardens and dooryards.

2. **L. purpureum, L.** Stem 6–18 in. high, silky-hairy or nearly smooth, reclining below, branched from the base. Leaves long-petioled, obtuse, heart-shaped, scalloped. Whorls of flowers mostly terminal, crowded. Corolla $\frac{1}{2}$–$\frac{3}{4}$ in. long, purple (rarely white). Introduced from Europe.

VI. LEONURUS, L.

Erect herbs. Leaves lobed. Whorls of flowers axillary, densely flowered, scattered; bractlets awl-shaped; flowers small, pink or white. Calyx 5-nerved, top-shaped, with 5 rather spiny, spreading teeth. Corolla with upper lip erect

and entire, lower 3-cleft. Stamens 4; anthers joined in pairs. Nutlets with 3 projecting angles, their sides channeled.

1. **L. cardiaca, L.** MOTHERWORT. Stem 2–4 ft. high, prominently angled, stiff, stout, upright, very leafy. Leaves palmately lobed or cleft; radical ones long-petioled; lower stem-leaves many-cleft, the upper ones 3-cleft, prominently nerved, the divisions acute. Corolla ½ in. long, pale rose-color, the upper lip and outside of the tube densely soft-bearded. Common about dooryards and fence-rows. Introduced from Europe.

VII. STACHYS, Tourn.

Herbs, rarely shrubs. Leaves scalloped or serrate. Whorls of flowers 2 or more flowered, usually in terminal racemes. Calyx nearly bell-shaped, 5-toothed. Corolla-tube cylindrical, usually with a ring of hairs inside, not dilated at the throat; upper lip erect or spreading; lower spreading, 3-lobed, the middle lobe largest. Stamens 4, the 2 lower longest.

1. **S. palustris, L.** Perennial; stem erect, 4-angled, 2–3 ft. high, hairy, especially on the angles, with projecting or reflexed hairs, leafy. Stem-leaves short-petioled or sessile, ovate-lanceolate or oblong-lanceolate, scalloped-serrate, coarsely or finely downy, roundish at the base, rather obtuse at the tip. Calyx bristly, the lance-awl-shaped teeth rather spiny. Upper lip of the corolla downy. In wet soil, especially N.

2. **S. aspera, Michx.** Taller than No. 1; angles of the stem covered with stiff reflexed bristles, but the sides often smooth. Leaves serrate, nearly all with distinct petioles. Calyx usually smooth. Corolla smooth throughout. Damp thickets and along streams.

VIII. SALVIA, L.

Annual, biennial, or perennial herbs, or sometimes shrubby. Flowers in spikes, racemes, or panicles, usually showy. Calyx tubular or bell shaped, not bearded in the throat, 2-lipped, the upper lip entire or 3-toothed, the lower 2-cleft. Corolla 2-lipped, the upper lip entire or notched, the lower spreading, 3-lobed, with the middle lobe longer. Stamens 2, short, anthers 2-celled, the upper cell fertile, the lower imperfect. Style 2-cleft. Nutlets smooth.*

1. **S. lyrata, L.** LYRE-LEAVED SALVIA. Biennial or perennial; stem erect, sparingly branched above, rough-hairy, 1–2 ft. high. Leaves mostly basal, spreading, lyrate-pinnatifid, usually purple, stem-leaves small, sessile or short-petioled. Racemes many-flowered, whorls about 6-flowered. Calyx-teeth short on the upper lip, long and awl-shaped on the lower. Corolla blue or purple, the tube about 1 in. long, dilated upward. On dry soil.*

2. **S. officinalis, L.** GARDEN SAGE. Stem shrubby, slender, much branched below, 1 ft. high. Leaves grayish-green, lance-oblong, crenate, wrinkled. Flowers in terminal spikes, whorls several-flowered. Corolla blue, upper lip strongly arched, about equaling the lower. Introduced from Europe and a common garden herb.*

IX. THYMUS, L.

Small, much-branched shrubs, very aromatic. Leaves small, entire, margins often rolled under. Whorls of flowers few-flowered, in loose or close spikes; bracts very small; flowers usually purple. Calyx ovoid, 2-lipped, upper lip 3-toothed, lower 2-cleft, woolly in the throat. Corolla slightly 2-lipped. Stamens 4, usually projecting from the flower, straight, lower pair longer.

1. **T. Serpyllum, L.** CREEPING THYME. Smooth or hairy, stem prostrate, the flowering branches somewhat ascending. Leaves $\frac{1}{8}$–$\frac{1}{4}$ in. long, flat, ovate or obovate-lanceolate, obtuse. Flowers crowded in spikes at the end of the branches. Corolla rose-purple, $\frac{1}{4}$–$\frac{3}{4}$ in. long. Becoming introduced from Europe.

2. **T. vulgaris, L.** GARDEN THYME. More erect than No. 1. Leaves somewhat curled under at the edges. Flower-clusters shorter and not all terminal. Corolla pale purple. Cultivated from Europe as an herb.

88. SOLANACEÆ. NIGHTSHADE FAMILY.

Mostly tropical herbs or shrubs (rarely trees). Leaves usually alternate, without stipules. Flowers regular, borne on bractless pedicels at or above the leaf axils, or in cymes. Calyx free from the ovary, 5-cleft, usually persistent. Corolla hypogynous, wheel-shaped, bell-shaped, or salver-shaped, 5-lobed. Stamens 5, short, inserted on the corolla-tube. Ovary 2-celled or imperfectly 4-celled; style simple; stigma simple or lobed. Fruit a many-seeded capsule or berry.

I. LYCIUM, L.

Shrubs or woody vines, often spiny. Leaves entire, alternate, often fascicled. Flowers solitary or clustered, terminal or axillary. Calyx persistent, 4–5-lobed or toothed, not enlarged in fruit. Corolla funnel-form or bell-shaped, the limb 4–5-lobed, the lobes obtuse. Stamens 4–5, projecting. Ovary 2-celled; style single; stigma obtuse. Fruit a many-seeded berry.*

1. **L. vulgare, Dunal.** MATRIMONY VINE. Stem slender, branching, twining or trailing, 6–15 ft. long; branches angled, spiny. Leaves elliptical, smooth, entire, sessile, or short-petioled. Flowers solitary or few in the axils; peduncles long and slender. Corolla spreading, greenish-purple, ⅓–½ in. wide. Berry oval, orange-red. Introduced from Africa, and often planted for covering trellises.*

II. SOLANUM, Tourn.

Herbs or shrubs; stems often prickly, sometimes climbing. Leaves alternate, often nearly or quite opposite. Flowers clustered, the peduncles often opposite or above the axils. Calyx spreading, 5-toothed or 5-cleft, persistent. Corolla wheel-shaped, 5-lobed. Stamens 5, projecting, the filaments very short, the anthers long and meeting about the style. Ovary 2-celled; style slender. Fruit a many-seeded, juicy berry.*

1. **S. Dulcamara, L.** BITTERSWEET. Perennial. Stems rather shrubby, long, and climbing. Leaves heart-shaped, or some of them with irregular lobes, or ear-like leaflets at the base. Flowers blue or purple, somewhat cymose. Berries showy, of many shades of orange and red in the same cluster, according to their maturity.

2. **S. nigrum, L.** NIGHTSHADE. Annual; stem smooth, or downy with simple hairs, erect, diffusely branched; branches wing-angled, 1–3 ft. high. Leaves ovate, irregularly toothed or entire, somewhat inequilateral, petioled. Flowers in lateral, peduncled umbels, small, white, drooping. Calyx-lobes obtuse; corolla ⅓–½ in. wide; filaments downy; berries globose, smooth, black when ripe. Common in cultivated fields and waste places.*

3. **S. carolinense, L.** HORSE NETTLE. Perennial; stem erect, branched, downy with star-shaped hairs, armed with straight, yellow prickles, 1–3 ft. high. Leaves ovate-oblong, deeply toothed or lobed,

acute at the apex, abruptly contracted to the short petiole, prickly on the veins. Racemes lateral, few-flowered; pedicels recurved in fruit. Calyx-lobes taper-pointed. Corolla deeply angular-lobed, blue or white; berry globose, smooth, yellow. A common weed.*

4. **S. rostratum, Dunal.** SAND BUR, BUFFALO BUR. Annual; the whole plant beset with yellow prickles; stem erect, diffusely branched, 1–2 ft. high. Leaves broadly oval or ovate in outline, deeply pinnately lobed or parted, petioled, downy, with star-shaped hairs. Racemes few-flowered; pedicels erect in fruit. Calyx very prickly, becoming enlarged and enclosing the fruit. Corolla bright yellow, 5-angled, about 1 in. broad. Introduced from the West, and becoming a troublesome weed in some places.*

5. **S. tuberosum, L.** IRISH POTATO. Annual; stem diffusely branched, downy, underground branches numerous and tuber-bearing. Leaves irregularly pinnatifid and divided. Flowers in cymose clusters, white or purple, with prominent yellow anthers; pedicels jointed. Corolla 5-angled, $\frac{3}{4}$–1 in. broad. Fruit a globose, greenish-yellow, many-seeded berry, about $\frac{1}{2}$ in. in diameter. Cultivated from Chili.*

III. LYCOPERSICUM, Tourn.

Annual; stem diffusely branched. Leaves pinnately divided. Flowers in raceme-like clusters on peduncles opposite the leaves. Calyx 5–many-parted, persistent. Corolla wheel-shaped, 5–6-parted. Stamens 5–6, inserted in the short tube of the corolla, filaments short, anthers elongated. Ovary 2–several-celled, style and stigma simple. Fruit a many-seeded berry.*

1. **L. esculentum, Mill.** TOMATO. Stem diffusely branched, at length leaning over, furrowed and angled below, sticky-hairy, 3–5 ft. long. Leaves irregularly lobed and pinnatifid, petioled. Calyx-lobes linear, about as long as the yellow corolla. Fruit (in the wild state) globose or ovoid, red or yellow, $\frac{1}{4}$–$\frac{1}{2}$ in. in diameter, but greatly enlarged in cultivation. Common in cultivation from tropical America.*

IV. DATURA, L.

Annual or perennial, strong-scented herbs; stems tall and branching. Leaves petioled, entire or lobed. Flowers large, solitary in the forks of the branches. Calyx tubular, 5-toothed or lobed, the upper part deciduous and the lower persistent. Corolla funnel-form, 5-angled. Stamens 5, inserted in the

corolla-tube. Ovary 2-celled or imperfectly 4-celled; style filiform; stigma 2-lobed. Fruit a spiny, 4-valved, many-seeded capsule.*

1. **D. Stramonium, L.** JIMSON-WEED. Annual; stem smooth, green, stout, forking above, 1–4 ft. high. Leaves ovate to oblong-ovate, acute at the apex, narrowed at the base, sinuate-toothed, petioled. Calyx 5-angled. Corolla white, about 4 in. long. Capsule ovoid, erect, 2 in. long. A common weed; poisonous. Introduced from Asia.*

2. **D. Tatula, L.** Taller, with a purple stem. Flowers rather later than No. 1; corolla violet-tinged.

V. PETUNIA, Juss.

Herbs; leaves alternate and entire. Divisions of the calyx oblong-spatulate. Corolla showy, spreading funnel-shaped, not perfectly regular. Stamens 5, somewhat unequal in length, inserted in the middle of the corolla-tube and not projecting beyond it. Capsule 2-celled, containing many very small seeds.

1. **P. violacea, Lindl.** COMMON PETUNIA. Stems rather weak and reclining. Leaves covered with clammy down. Corolla varying from pale pink to bright purplish-red, often variegated, with a broad, inflated tube, which is hardly twice as long as the calyx. Cultivated annual from South America.

2. **P. nyctaginiflora, Juss.** WHITE PETUNIA. Leaves somewhat petioled. Tube of corolla long and slender. Flowers white. Cultivated from South America. This and the preceding species much mixed by hybridization.

89. SCROPHULARIACEÆ. FIGWORT FAMILY.

Mostly herbs, with irregular flowers. Calyx free from the ovary and persistent. Corolla 2-lipped or otherwise more or less irregular. Stamens usually 2 long and 2 short, or only 2 in all, inserted on the corolla-tube, often 1 or 3 of them imperfectly developed. Pistil consisting of a 2-celled and usually many-ovuled ovary, with a single style and an entire or 2-lobed stigma.

Corolla wheel-shaped, stamens 5. Verbascum, I.

Corolla wheel-shaped or salver-shaped, nearly regular, stamens 2. Veronica, VI.

Corolla 2-lipped, the mouth closed by a palate, tubular below, a spur at the base. Linaria, II.

Corolla 2-lipped, the mouth closed by a palate, tubular below, a short, broad pouch at the base. Antirrhinum, III.

Corolla decidedly 2-lipped.

Stamens with anthers 2. Gratiola, V.

Stamens 4, with a fifth antherless filament. Pentstemon, IV.

Stamens 4, the anther-cells unequal. Castilleia, VII.

Stamens 4, the anther-cells equal. Pedicularis, VIII.

I. VERBASCUM, L.

Biennial; stem tall, erect. Leaves alternate. Flowers in spikes, racemes or panicles. Calyx deeply 5-cleft. Corolla wheel-shaped, 5-lobed, the lobes nearly equal. Stamens 5, unequal, declined, some or all of the filaments bearded. Style flattened at the apex. Fruit a globose capsule; seeds roughened.*

1. **V. Blattaria, L.** Moth Mullein. Stem erect, slender, simple or sparingly branched, smooth below, downy above, 2–4 ft. high. Leaves oblong to lanceolate, acute at the apex, obtuse or truncate at the base, dentate to pinnately lobed, the lower petioled, the upper sessile and clasping. Raceme long and loose, glandular-downy, pedicels bracted. Corolla white or yellow, marked with brown on the back, about 1 in. wide. Filaments all bearded with purple hairs. Capsule longer than the calyx. Common in fields and waste places; introduced from Europe.*

II. LINARIA, Tourn.

Herbs, rarely shrubby. Lower leaves opposite, whorled or alternate. Flowers in bracted racemes or spikes or axillary and solitary. Calyx 5-parted. Corolla 2-lipped, the tube spurred. Stamens 4, with sometimes a rudiment of a fifth. Stigma notched or 2-lobed. Capsule ovoid or globose; cells nearly equal.

1. **L. vulgaris, Miller.** BUTTER-AND-EGGS, JACOB'S LADDER, WILD FLAX. A perennial, erect, smooth herb, with a bloom, stem 1–2 ft. high. Leaves linear or lanceolate, 1–3 in. long, often whorled. Racemes densely flowered. Sepals shorter than the spur. Corolla yellow, ¾–1 in. long; spur parallel to and as long as the tube; throat closed by a palate-like fold. Common in dry fields and pastures and along roadsides; introduced from Europe.

2. **L. canadensis, Dumont.** TOAD-FLAX. Biennial; flowering stems erect, slender, rarely branched, smooth, 1–2 ft. high, sterile stems prostrate, with opposite or whorled leaves, 2–6 in. long. Leaves linear, entire, sessile. Racemes erect, slender; pedicels erect, as long as the calyx. Corolla small, blue and white, the spur thread-like, curved, longer than the pedicels. Capsule 2-valved, the valves 3-toothed. On dry or cultivated ground E.

III. ANTIRRHINUM, Tourn.

Annual or perennial herbs. Leaves entire, rarely lobed, the lower ones opposite, the upper alternate. Flowers axillary and solitary or racemed and bracted. Calyx 5-parted. Corolla 2-lipped. The tube with a sac, the broad bearded palate closing the throat. Stamens 4. Stigma with 2 short lobes. Capsule 2-celled, the upper cell opening by 1 pore, the lower by 2.

1. **A. majus, L.** SNAPDRAGON. Perennial; stem erect, smooth below, glandular-downy above, 1–2 ft. high. Leaves linear to oblong-lanceolate, entire, smooth, sometimes fleshy, sessile or short-petioled. Flowers in a terminal raceme; pedicels short, stout, erect in fruit. Corolla 1½–2 in. long, of many colors. Capsule oblique, the persistent base of the style bent forward. Common in gardens, cultivated from Europe, and often escaped.*

IV. PENTSTEMON, Mitchell.

Perennials, the stems branching from the base, unbranched above. Leaves opposite. Flowers usually showy in a terminal panicle. Calyx of 5 nearly distinct sepals. Corolla tubular, the tube wide above and narrowed below; 2-lipped. Stamens 4, 2 long and 2 short, with a fifth antherless filament as long as the others, its upper half bearded. Capsule ovoid, acute.

1. **P. pubescens, Solander.** Stem somewhat sticky-downy, 1–2 ft. high. Leaves varying from oblong to lanceolate, 2–4 in. long,

usually with small teeth. Flower-cluster narrow. Corolla dingy violet, purplish, or whitish, the tube not much widened above, its throat nearly closed by a hairy palate. Sterile filament much bearded. Dry hillsides or stony ground.

2. **P. lævigatus, Solander.** Stem usually smooth except the flower-cluster, 2–4 ft. high. Leaves shining, those of the stem ovate-lanceolate or broadly lanceolate, 2–5 in. long, with a somewhat heart-shaped clasping base. Flower-cluster broader than in No. 1. Corolla white or oftener purplish, suddenly widened above, the throat not closed. Sterile filament slightly bearded toward the top. In rich soil.

3. **P. barbatus, Nutt.** Stems slender and rod-like, 3–4 ft. high. Leaves lanceolate, entire. Flower-cluster long and loosely flowered. Flowers showy, drooping. Corolla-tube slender, scarlet, somewhat bearded in the throat. Sterile filament beardless. Cultivated from Mexico.

V. GRATIOLA, L.

Low herbs growing in wet or damp ground. Leaves opposite, sessile. Flowers axillary and solitary, peduncled. Calyx 5-parted, usually with 2 bractlets at the base. Corolla somewhat 2-lipped. Perfect stamens 2. Stigma enlarged or 2-lipped. Pod 4-valved, many-seeded.

1. **G. virginiana, L.** Stem cylindrical, 4–10 in. long, branching from the base. Leaves ¾–1½ in. long, varying from lance-oblong to spatulate. Corolla pale yellow, tinged with red. Common in muddy soil, along brooksides, etc.

VI. VERONICA, Tourn.

Herbs or shrubs. Lower leaves or all the leaves opposite, rarely whorled. Flowers in axillary or terminal racemes, rarely solitary. Calyx usually 4-parted. Corolla wheel-shaped or somewhat bell-shaped; limb usually 4-cleft, spreading, the side lobes commonly narrower. Stamens 2, inserted on the corolla-tube at the sides of the upper lobe, projecting. Stigma somewhat knobbed. Capsule generally flattened, often notched at the apex, 2-celled, few–many-seeded.

1. **V. americana, Schweinitz.** BROOKLIME. A perennial smooth herb, somewhat prostrate below, but the upper parts of the stem erect, 8–15 in. high. Leaves 1–2 in. long, lance-ovate or oblong,

serrate, short-petioled. Racemes 2–4 in. long, axillary and opposite. Corolla wheel-shaped, blue. Capsule swollen, roundish. Muddy soil about springs and brooks.

2. **V. officinalis, L.** COMMON SPEEDWELL, GYPSY WEED. Perennial. Roughish-downy, with the prostrate stems spreading and rooting. Leaves wedge-oblong or nearly so, obtuse, serrate, somewhat petioled. Racemes dense, of many pale bluish flowers. Capsule rather large, inversely heart-shaped and somewhat triangular. Dry hillsides, open woods and fields.

3. **V. serpyllifolia, L.** THYME-LEAVED SPEEDWELL. Perennial. Smooth or nearly so; branching and creeping below, but with nearly simple ascending shoots, 2–4 in. high. Leaves slightly crenate, the lowest ones petioled and roundish, those farther up ovate or oblong, the uppermost ones mere bracts. Raceme loosely flowered. Corolla nearly white or pale blue, beautifully striped with darker lines; capsule inversely heart-shaped, its width greater than its length. Damp grassy ground; a common weed in lawns.

4. **V. peregrina, L.** PURSLANE SPEEDWELL. A homely, rather fleshy, somewhat erect-branched annual weed, 4–9 in. high. Lowest leaves petioled, oblong, somewhat toothed, those above them sessile, the uppermost ones broadly linear and entire. Flowers solitary, inconspicuous, whitish, barely pediceled, appearing to spring from the axils of the small floral leaves. Corolla shorter than the calyx. Roundish, barely notched, many-seeded. Common in damp ground, in fields and gardens.

VII. CASTILLEIA, Mutis.

Herbs parasitic on the roots of other plants. Leaves alternate; the floral ones usually colored at the tip and more showy than the flowers. Flowers yellow or purplish in terminal leafy spikes. Calyx tubular, flattened, 2–4-cleft. Corolla-tube included within the calyx; upper lip of the corolla very long, linear, arched, and enclosing the stamens, 2 of which are long and 2 short. Ovary many-ovuled.

1. **C. coccinea, Sprengel.** SCARLET PAINTED CUP, PAINT-BRUSH, INDIAN PINK, PRAIRIE FIRE, WICKAKEE. A hairy, simple-stemmed herb. Annual or biennial. Root-leaves clustered obovate or oblong. Stem-leaves cut; floral leaves 3–5 cleft and bright scarlet (occasionally yellow) toward the tips, as though dipped in a scarlet dye. Calyx nearly as long as the pale yellow corolla, 2-cleft. The spikes are often very broad, making this one of the most conspicuous of our native flowers. Damp, sandy ground, or on bluffs near streams; sometimes in marshes.

VIII. PEDICULARIS, Tourn.

Perennial herbs, with the lower leaves pinnately cut and the floral ones reduced to bracts. Flowers spiked. Corolla markedly 2-lipped; the upper lip much flattened laterally and arched, the lower lip spreading, 3-lobed. Stamens 4, beneath the upper lip. Capsule 2-celled, tipped with an abrupt point, several-seeded.

1. **P. canadensis, L.** COMMON LOUSEWORT. Hairy, with clustered simple stems, 1 ft. high or less. Leaves petioled, the lowermost ones pinnately parted, the others somewhat pinnately cut; spike short, closely flowered and leafy-bracted; calyx split down the front; corolla greenish-yellow and purplish, with its upper lip hood-like, curved under, and with 2 awl-like teeth near the end; capsule flat, broadly sword-shaped. Knolls and openings among thickets.

90. BIGNONIACEÆ. BIGNONIA FAMILY.

Trees or shrubs, often twining or climbing, rarely herbs. Leaves usually opposite, without stipules. Flowers showy, irregular. Corolla tubular, with a widened throat and a 5-lobed limb. Stamens usually 2 long and 2 short, or only 2. Ovary free from the calyx, 2-celled or rarely 1-celled, with many ovules. Fruit a capsule; seeds large, winged.

I. BIGNONIA, Tourn.

Woody vines. Leaves opposite, compound, usually tendril-bearing. Flowers large, in axillary clusters. Calyx cup-shaped, truncate, or undulate-toothed. Corolla spreading-tubular, somewhat 2-lipped, the lobes rounded. Stamens 4, 2 long and 2 short. Capsule linear, flattened parallel with the partition, the two valves separating from the partition at maturity. Seeds flat, broadly winged.*

1. **B. capreolata, L.** CROSS-VINE. Stem climbing high, a transverse section of the older stems showing a conspicuous cross formed by the 4 medullary rays; branches smooth. Leaves evergreen, petioled; leaflets 2, ovate, taper-pointed with a blunt apex, heart-shaped at the base, entire, stalked, upper leaflets transformed into

branching tendrils. Flowers numerous, short-peduncled. Corolla 2 in. long, reddish-brown without, yellow within. Capsule 6 in. long, flat, the valves with a prominent central nerve. Seeds broadly winged on the sides, short-winged on the ends. Common in woods S.*

II. TECOMA, Juss.

Woody vines, climbing by aerial rootlets. Leaves compound, odd-pinnate. Flowers large, in terminal clusters. Calyx bell-shaped, unequally 5-toothed. Corolla funnel-form, enlarged above the calyx, 5-lobed, slightly 2-lipped. Stamens 4, 2 long and 2 short. Capsule slender, spindle-shaped, slightly compressed contrary to the partition, 2-valved, dehiscent. Seeds winged.*

1. **T. radicans, Juss.** TRUMPET FLOWER, TRUMPET CREEPER. Stems climbing high by numerous rootlets, bark shreddy. Leaves deciduous, petioled; leaflets 9–11, ovate to ovate-lanceolate, serrate, short-stalked, smooth or slightly downy. Flowers in short, terminal racemes or corymbs. Calyx tubular, ¾ in. long. Corolla 2–3 in. long, scarlet without, yellow within, the lobes spreading. Capsule 5–6 in. long, curved, often persistent through the winter. Seeds broadly winged. On borders of fields and in woods S.; often cultivated.*

III. CATALPA, Scop., Walt.

Small trees. Leaves large, opposite, simple, petioled, deciduous. Flowers large and showy, in terminal panicles. Calyx irregularly 2-lipped. Corolla tubular-bell-shaped, oblique, 5-lobed, 2-lipped. Fertile stamens 2, sterile stamens 3, short. Fruit a linear, 2-valved, many-seeded capsule. Seeds winged.*

1. **C. bignonioides, Walt.** CATALPA. A small tree with thin, rough, gray bark and light, soft, but exceedingly durable wood. Leaves long-petioled, heart-shaped, entire or palmately 3-lobed, taper-pointed at the apex, palmately veined, downy. Branches of the panicle in threes; flowers large, 1–1½ in. long, white, variegated with yellow and purple. Corolla lobes undulate or crisped. Capsule very slender, 1 ft. or more in length, pendulous. Seeds with long, fringed wings. On margins of rivers and swamps S., often cultivated.*

2. **C. speciosa, Warder.** CATALPA. A tall tree with very durable wood. Leaves large, heart-shaped, taper-pointed. Corolla about 2 in. long, almost white, but slightly spotted; tube inversely conical;

limb somewhat oblique, its lower lobe notched. Pod rather stout. Rich, damp woods, especially S. W.; often cultivated.

91. OROBANCHACEÆ. Broom-rape Family.

Leafless brownish root-parasites. Rootstock often tuberous, naked or scaly. Stem usually stout, solitary, scaly. Flowers spiked or racemed. Sepals 4–5, free from the ovary. Corolla hypogynous, irregular, the tube curved; the limb 2-lipped. Stamens 4, 2 long and 2 short, inserted on the corolla-tube; anthers 2-celled, the cells spurred at the base. Ovary 1-celled, of 2 carpels, style simple, stigma 2-lobed; ovules many. Capsule 1-celled, 2-valved, few–many-seeded; seeds very small.

I. CONOPHOLIS, Wallroth.

Stems often clustered, stout, covered with scales which overlap, the uppermost ones each with an axillary flower, thus forming a spike. Calyx irregularly 4–5 cleft, split down the lower side. Corolla swollen below, decidedly 2-lipped, the upper lip arched. Stamens projecting.

1. **C. americana, Wallroth.** Squaw-root, Cancer-root. Stems 3–6 in. high, yellowish or yellowish-brown. Flowers numerous, inconspicuous. Corolla dirty white or pale brown. In oak woods, not very common.

II. APHYLLON, Mitchell.

Brownish or whitish plants with naked scapes borne on scaly, mostly underground stems. Calyx regular, 5-cleft. Corolla 5-lobed, slightly irregular. Stamens not projecting from the corolla-tube.

1. **Aphyllon uniflorum, Gray.** One-flowered Cancer-root. Slightly covered with clammy down. Stems very short-branched, each with 1–3 1-flowered scapes 3–5 in. high. Calyx-lobes lance-awl-shaped, half as long as the corolla. Corolla yellowish-white, veiny, purple-tinged, palate with 2 yellow bearded ridges. Damp woods.

2. **A. fasciculatum, Gray.** Stem scaly, upright, 3–4 in. high above ground and generally longer than the numerous 1-flowered peduncles. Calyx-lobes short, triangular. Parasitic on wild species of *Artemisia*, etc., in sandy and loamy soil N. W. and W.

92. LENTIBULARIACEÆ. Bladderwort Family.

Scape-bearing herbs, chiefly aquatic or living in marshes. Leaves are often thread-like and floating, without stipules. Flowers irregular. Calyx free from the ovary, persistent. Corolla hypogynous, 2-lipped, the tube short, spurred at the base. Stamens 2, opposite the lateral sepals, hypogynous or inserted on the corolla-tube. Ovary free, 1-celled; style short, thick, stigma 2-lipped, ovules many. Capsule 2-valved or bursting irregularly, many-seeded.

UTRICULARIA, L.

Aquatic or terrestrial herbs, often floating and propagated by buds which break loose from the plant and sink to the bottom of the pond or stream during the winter. Leaves of the aquatic species floating, thread-like, furnished with little bladders in which animalcules are caught. Flowers often rather showy, solitary, spiked or racemed. Corolla with its throat nearly closed by the palate. Capsule globose, bursting irregularly.

1. **U. cornuta, Michx.** Horned Bladderwort. Stemless. Leaves linear and entire or none; air bladders few or none. Scape erect, stout, 2–5-flowered, 8–12 in. high. Flowers yellow, fragrant, ¾ in. wide. Pedicel as long as the calyx. Lips of the corolla obovate, unequal, the lower longer, abruptly pointed, the sides reflexed, as long as the horn-shaped, curved spur, throat bearded. Seeds minutely pitted. In swamps and muddy places.*

2. **U. subulata, L.** Small Bladderwort. Scape thread-like, 2–6 in. high. Leaves few and awl-shaped or none; air bladders few or none. Racemes zigzag, 1–6-flowered; pedicels much longer than the calyx. Corolla yellow, ¼ in. wide, the lower lip 3-lobed, longer than the appressed, conical, green-pointed spur. Wet, sandy soil.*

3. **U. inflata, Walt.** Swollen Bladderwort. Perennial; stem very slender, floating. Leaves finely dissected, the lower ones scattered, the upper ones whorled; the petioles dilated upward and inflated, air bladders very numerous. Scape stout, 6–12 in. high, 3–10-flowered. Corolla yellow, about ¾ in. wide, upper lip ovate, slightly lobed, lower lip 3-lobed, twice the length of the curved, emarginate spur. Fruit nodding. In ponds and still water.*

4. U. vulgaris, L. GREATER BLADDERWORT. Stems submerged, leafy, 1–3 ft. long. Leaves spreading, pinnately cut into very many thread-like segments which bear many bladders. Scapes 6–12 in. long, 5–12-flowered, pedicels bent down after flowering. Corolla ½–¾ in. long, yellow, upper lip broad and short, palate prominent; spur conical, pressed close to the under lip. Ponds and slowly flowing streams.

93. ACANTHACEÆ. ACANTHUS FAMILY.

Herbs or shrubs. Leaves opposite or whorled, without stipules. Flowers irregular, usually with large bracts. Calyx of 4 or 5 unequal segments which considerably overlap each other. Corolla 4–5-parted and usually more or less 2-lipped. Stamens usually 2 long and 2 short, sometimes only 2. Ovary free from the calyx. Fruit usually a capsule. Seeds not winged. A large family, mostly tropical, with only a few insignificant wild species in the northern United States.

I. RUELLIA, Plumier.

Perennial herbs; stems swollen at the joints and often between them, somewhat 4-angled. Leaves sessile or short-petioled, mostly entire. Flowers axillary, solitary or clustered, showy, white, blue, or purple. Calyx 2-bracted, 5-parted, the divisions linear and awl-shaped. Corolla-tube slender, often much elongated, the limb spreading, nearly equally 5-lobed. Stamens 4, 2 long and 2 short, included or slightly projecting. Style slender. Capsule slender, narrowed below, 4–12-seeded.*

1. R. strepens, L. SMOOTH RUELLIA. Stem erect, slender, usually simple, smooth or hairy, 1–3 ft. high. Leaves ovate to oblong, acute at the apex, narrowed below into a short petiole. Flowers solitary or in small clusters, sessile or short-peduncled. Calyx-lobes shorter than the tube of the corolla, downy or fringed Corolla blue, the tube 1½–2 in. long, the limb 1–1½ in. wide. Capsule usually longer than the calyx, smooth, 8–12-seeded. The later flowers often without a corolla. On rich, dry soil.*

2. R. ciliosa, Pursh. HAIRY RUELLIA. Stem erect, rather stout, often few-branched above, covered with white hairs, 4–30 in. high. Leaves oblong to ovate, acute or obtuse at the apex, narrowed and

mostly sessile at the base, hairy-fringed. Flowers pale blue, solitary or 2–3 together. Calyx-lobes bristle-shaped, half the length of the corolla-tube. Tube of the corolla 2 in. long. Capsule shorter than the calyx, smooth, 8–12-seeded. A very variable species, the flowers often without a corolla. In dry woods and fields S.*

II. DIANTHERA, Gronov.

Perennial herbs; stem smooth. Leaves opposite, entire or toothed. Flowers axillary, solitary or clustered, irregular. Calyx 5-parted. Corolla 2-lipped, upper lip erect, concave, entire or notched, the lower prominently veined, spreading, 3-lobed. Stamens 2, inserted in the throat of the corolla. Ovary 2-celled, 4-ovuled, style simple, acute. Capsule flattened, narrowed below into a little stalk.*

1. **D. americana, L.** WATER WILLOW. Stem erect, slender, 2–3 ft. high. Leaves lanceolate to linear-lanceolate, taper-pointed at the apex, narrowed below to the sessile or short-petioled base. Flowers bracted, in short spikes, on peduncles as long as the leaves. Corolla pale blue or purple, the tube as long as the lips, lower lip wrinkled. Capsule about the length of the calyx. In water S.*

94. PLANTAGINACEÆ. PLANTAIN FAMILY.

Annual or perennial scape-bearing herbs. Leaves usually all radical, with parallel ribs. Flowers small, green, usually spiked, regular and perfect (Fig. 21). Sepals 4, persistent. Corolla hypogynous, salver-shaped, thin and dry; lobes 4, spreading. Stamens 4, usually inserted on the corolla-tube, filaments thread-like, anthers large and versatile. Ovary free, usually 2–4-celled; style thread-like. Fruit a 1–4-celled, 1 or more seeded membranous capsule, which splits open transversely, the top coming off like a lid.

PLANTAGO, L.

Characteristics of the genus as given above for the family.

1. **P. major, L.** PLANTAIN. Perennial, from a very short root-stock. Leaves ovate to oval, strongly 5–9-ribbed, acute or obtuse at

the apex, rounded at the base into a long, concave petiole, entire or toothed, smooth or slightly downy. Scape taller than the leaves, downy, spike densely flowered; bracts short, ovate. Flowers perfect. Stamens 4, projecting. Capsule ovoid, about twice the length of the calyx. Common in dooryards.*

2. **P. lanceolata, L.** RIBGRASS. Biennial or perennial; soft-hairy or nearly smooth. Leaves numerous, lanceolate to elliptical, acute, long-petioled, strongly 3–5-ribbed, entire or toothed. Scapes much longer than the leaves, striate-angled, 1–2 ft. high, spike short and dense. Bracts and sepals ovate. Corolla smooth. Capsule longer than the calyx, 2-seeded. Introduced; common in meadows.*

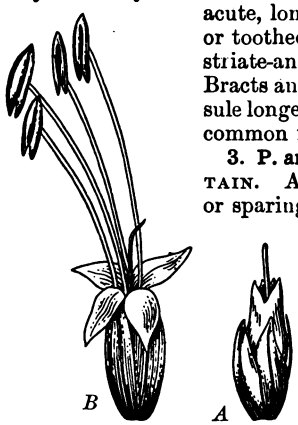


FIG. 21. — Flowers of Plantain (*Plantago*), enlarged.

A, earlier stage, pistil mature, stamens not yet appearing outside the corolla. *B*, later stage, pistil withered, stamens mature.

3. **P. aristata, Michx.** LARGE-BRACTED PLANTAIN. Annual. Leaves broadly linear, entire or sparingly and finely toothed, narrowed below into a margined petiole, smooth or silky-downy. Scape longer than the leaves, 6–10 in. high, spike dense. Bracts linear, ½–1 in. long. Stamens 4; capsule 2-seeded, longer than the calyx. Common on dry soil.*

4. **P. heterophylla, Nutt.** MANY-SEEDED PLANTAIN. Annual. Leaves linear, fleshy, entire, or with a few spreading teeth, smooth or slightly downy. Scapes slender, 3–6 in. high, spike very slender, many-flowered, the lower flowers often scattered. Bracts ovate, longer than the sepals. Stamens 2. Capsule twice the length of the calyx, many-seeded. Common in cultivated ground, especially S.*

95. RUBIACEÆ. MADDER FAMILY.

Herbs, shrubs, or trees. Leaves opposite and entire, with stipules between them, or appearing whorled since the stipules resemble the leaves. Flowers always perfect, frequently dimorphous (as in Houstonia, Mitchella, and Bouvardia). Calyx-tube adnate to the ovary; limb 3–6-toothed. Corolla regular, inserted on the calyx-tube, as many-lobed as the calyx. Stamens equal in number to the divisions of the corolla. Ovary 2 or more celled. A very large and important

family, of which many of the important species, for instance, the coffee shrub and the cinchona tree, are natives of warm or tropical climates.

I. HOUSTONIA, L.

Annual, biennial, or perennial herbs; stems erect or diffuse. Leaves entire, stipules often only a line connecting the bases of opposite leaves. Flowers small, solitary, or clustered. Calyx 4-toothed, persistent. Corolla wheel-shaped to funnel-form, 4-lobed. Stamens 4. Ovary 2-celled, style slender, stigmas 2. Fruit a 2-celled, few–many-seeded capsule, opening at the apex, free from the calyx.*

1. **H. cœrulea, L.** BLUETS, INNOCENCE, QUAKER LADIES, EYEBRIGHT. Perennial, from very slender rootstocks; stems tufted, erect, smooth, forking, 3–6 in. high. Leaves sessile, often hairy-fringed, the lower spatulate, the upper lanceolate. Flowers solitary, on slender axillary peduncles. Calyx small. Corolla salver-form, blue or white, yellow in the throat, smooth, of two forms, the stamens projecting and the style short in one form, while in the other the stamens are short and the style projecting. Capsule laterally compressed, 2-lobed, shorter than the calyx. Common on open ground.*

2. **H. patens, Ell.** SMALL BLUETS. Annual. Stem erect, branched at the base, forking above, smooth, 2–4 in. high. Lower leaves oval to ovate, petioled, the upper narrower and sessile. Flowers solitary, on slender, axillary peduncles, blue or white. Calyx small. Lobes of the corolla about as long as the tube; stamens and style projecting or included. Capsule compressed, as long as the calyx. Common on dry, open ground.*

3. **H. purpurea, L.** LARGE BLUETS. Perennial; stem stout, erect, simple or branched, smooth or downy, 4-angled, 6–12 in. high. Leaves ovate to ovate-lanceolate, sessile or short-petioled, 3–5-nerved, often hairy-fringed on the margins. Flowers in terminal cymes, purple to nearly white. Corolla funnel-form, the tube longer than the limb, hairy within. Stamens and style projecting or included. Capsule compressed-globose, much shorter than the calyx. In dry, open woods.*

Var. longifolia, Gray. LONG-LEAVED BLUETS. Perennial. Stem erect, branched, smooth, 4-angled, 8–12 in. high. Leaves sessile, the lower oblanceolate or spatulate, the upper linear, 1-nerved. Corymbs terminal, few-flowered. Corolla light purple to white, the lobes much shorter than the tube. Capsule compressed-globose, nearly as long as the calyx. In dry, open woods.*

II. BOUVARDIA, Salisb.

Smooth perennials. Leaves lanceolate, thickish. Calyx 4-lobed, the divisions slender. Corolla with a long and narrow or rather trumpet-shaped tube and spreading 4-lobed limb. Anthers 4, inserted in the throat of the corolla, almost sessile. Stigmas 2, flat. Capsule globular, 2-celled, many-seeded. Flowers dimorphous.

1. **B. triphylla, Salisb.** THREE-LEAVED BOUVARDIA. Somewhat shrubby. Leaves nearly smooth, ovate or oblong-ovate, the lower ones in threes, the upper ones sometimes in pairs. Corolla scarlet and slightly downy outside.

2. **B. leiantha, Benth.** DOWNY-LEAVED BOUVARDIA. Leaves rather downy. Corolla deep scarlet, smooth outside.

Both species cultivated from Mexico; in greenhouses.

III. MITCHELLA, L.

A pretty trailing evergreen herb. Leaves roundish-ovate, petioled. Flowers fragrant, white or pinkish, dimorphous, growing in pairs, joined by their ovaries. Calyx 4-toothed. Corolla funnel-shaped, with the lobes bearded within. Stamens 4, short. Style 1, stigmas 4, slender. Fruit double, composed of the united ovaries, really a stone-fruit containing 8 seed-like bony nutlets, ripening into tasteless scarlet berries which cling to the plant through the winter.

1. **M. repens, L.** PARTRIDGE BERRY, SQUAW VINE, TWO-EYE BERRY. Common in dry woods, especially under evergreen coniferous trees.

IV. GALIUM, L.

Annual or perennial herbs; stems slender, 4-angled. Leaves appearing whorled. Flowers small, in axillary or terminal cymes or panicles, perfect or rarely dicœcious. Calyx-tube short, the teeth minute or wanting. Corolla wheel-shaped, 3–4-lobed. Stamens 3–4, short. Ovary 2-celled, styles 2, short, united below. Fruit 2, united, sometimes fleshy, 1-seeded carpels which do not split open.*

1. **G. Aparine, L.** GOOSEGRASS. Annual; stem weak, decumbent, sharply 4-angled and with backward pointing prickly hairs,

widely branched, 2–4 ft. long. Leaves 6–8 in a whorl, oblanceolate, prickly-hairy on the margins and midrib. Peduncles axillary, longer than the leaves, 1–3-flowered; flowers white. Fruiting pedicels erect; fruit dry, covered with hooked bristles. In waste places.*

2. **G. circæzans, Michx.** WILD LICORICE. Perennial; stems several, erect, smooth or downy, 12–18 in. high. Leaves 4 in a whorl, oval to ovate, obtuse at the apex, strongly 3-nerved, downy. Cymes long-peduncled, repeatedly branched. Flowers nearly sessile, greenish-purple; pedicels at length recurved. Fruit with hooked bristles. In dry, open woods S. Easily recognized by the sweet, licorice-like taste of the leaves.*

3. **G. hispidulum, Michx.** BEDSTRAW. Perennial, from yellow roots; stems diffusely branched, smooth or slightly roughened, downy at the joints, erect or decumbent, 1–2 ft. long. Leaves 4 in a whorl, narrowly oval, acute, rough on the margins and mid-vein. Peduncles 1–3-flowered; flowers white. Pedicels becoming reflexed; fruit a bluish-black, roughened berry. On dry, sandy soil.*

4. **G. triflorum, Michx.** Perennial; stems reclining or prostrate, angles rough-bristly. Leaves mostly in sixes, lance-oblong, mucronate. Flowers usually in threes, on slender peduncles. Woodlands, especially N.

96. CAPRIFOLIACEÆ. HONEYSUCKLE FAMILY.

Mostly shrubs. Leaves opposite, without true stipules. Flowers often irregular. Calyx-tube adnate to the ovary. Corolla tubular or wheel-shaped. Stamens usually as many as the corolla-lobes and inserted on the corolla-tube. Fruit a berry, stone-fruit, or capsule.

I. SAMBUCUS, Tourn.

Shrubs with odd-pinnate leaves. Calyx-limb minute or wanting. Flowers very many, small, white, in compound cymes. Corolla with a small, somewhat urn-shaped tube and a flattish, spreading, 5-cleft limb. Stamens 5. Stigmas 3, sessile. Fruit a globular, pulpy stone-fruit, 3-seeded, appearing like a berry.

1. **S. canadensis, L.** COMMON ELDER. Stems 5–10 ft. high, with a thin cylinder of wood surrounding abundant white pith.

Leaflets 5–11, oblong, taper-pointed, smooth. Cymes flat and often very large. Fruit purplish-black, insipid or almost nauseous, but somewhat used in cookery.

2. **S. racemosa, L.** RED-BERRIED ELDER. More woody, with brown pith. Leaflets fewer, downy beneath, especially when young. Cymes panicled and somewhat pyramidal. Fruit scarlet.

II. VIBURNUM, L.

Shrubs or small trees. Leaves simple, entire, dentate or lobed, with or without stipules. Flowers small, white, in terminal cymes, the outer flowers of the cyme sometimes greatly enlarged and sterile. Calyx-tube very small, 5-toothed. Corolla wheel-shaped or bell-shaped, 5-lobed. Stamens 5, inserted in the tube of the corolla. Ovary 1–3-celled, 1–3-ovuled, but only 1 ovule maturing; style short, 3-lobed. Fruit a 1-seeded stone-fruit.*

A.

Flowers around the margin of the cyme without stamens or pistils, large and showy.

1. **V. lantanoides, Michx.** HOBBLE-BUSH, WITCH-HOBBLE. A shrub about 5 ft. high, with the branches reclining and often rooting and forming loops (whence the popular names). Leaves very large, roundish, abruptly taper-pointed, serrate, with a rusty down on the petioles and veinlets. Cymes very broad and showy. Fruit red, not eatable.

2. **V. Opulus, L.** CRANBERRY TREE, HIGH-BUSH CRANBERRY. A handsome, upright shrub. Leaves 3–5-ribbed and 3-lobed. Fruit bright red, juicy, very acid, and used as a substitute for cranberries. Common N. The form known as "Snowball" with all the flowers showy and sterile is cultivated from Europe.

B.

Flowers all small and perfect.

3. **V. acerifolium, L.** MAPLE-LEAVED ARROWWOOD. A slender shrub 3–6 ft. high. Leaves broadly ovate to heart-shaped, palmately veined and 3-lobed, serrate or nearly entire, petioled, downy, becoming smooth above. Cymes peduncled, about 7-rayed, 2–3 in. wide; sterile flowers none. Fruit oval, black, stone flat, 2-ridged on the edges. In dry, open woods.*

4. V. dentatum, L. ARROWWOOD. A shrub 8–15 ft. high. Leaves broadly ovate to oval, acute at the apex, rounded or heart-shaped at the base, coarsely dentate, smooth above, hairy in the axils of the veins beneath, short-petioled. Cymes long-peduncled, 7-rayed, 2–3 in. wide; sterile flowers none. Calyx smooth. Fruit globose, dark blue, stone compressed, grooved on one side. In rich, damp soil.*

5. V. nudum, L. WITHE-ROD. A shrub 8–12 ft. high. Leaves ovate to lanceolate, entire or slightly toothed, acute at both ends, thick, smooth above, the veins prominent beneath; petiole short. Cymes short-peduncled, 5-rayed; sterile flowers none. Fruit ovoid, blue. Common in swamps.*

6. V. prunifolium, L. BLACK HAW. A small tree, 15–20 ft. high. Leaves oval to ovate, acute or obtuse at each end, finely and sharply serrate, smooth and shining above, often slightly downy beneath; petioles dilated and rusty-downy. Cymes sessile, large, 4–5-rayed; sterile flowers none. Fruit oval, bluish-black, eatable. In rich, moist woods.*

III. SYMPHORICARPOS, Dill.

Shrubs. Leaves short-petioled, deciduous. Flowers in axillary clusters. Calyx-tube globose, 4–5-toothed. Corolla bell-shaped, 4–5-lobed, sometimes knobbed at the base, smooth or hairy within. Stamens 4–5. Ovary 4-celled, 2 of the cells with a single fertile ovule in each, the other cells with several abortive ovules; style slender, stigma knobbed or 2-lobed. Fruit a 4-celled, 2-seeded berry.*

1. S. racemosus, Michx. SNOWBERRY. An ornamental shrub, 2–3 ft. high. Flowers in loose terminal racemes, which are often leafy. Corolla bell-shaped, much bearded inside, pinkish-white. Stamens and style not projecting. Berries rather large, snow-white, remaining long on the branches. Rocky banks, often cultivated.

IV. LINNÆA, Gronov.

A very small, slender, creeping evergreen shrub; branches inclined, ending in a slender, erect, 2-flowered peduncle. Leaves opposite, without stipules. Flowers nodding, on slender pedicels, with 2 bractlets. Calyx-tube ovoid; limb 5-lobed. Corolla nearly bell-shaped, 5-lobed. Stamens 4, inserted near the base of the corolla, 2 of them longer than the other 2.

Ovary 3-celled; style thread-like, stigma knobbed; ovules many in 1 cell, solitary in the 2 others. Fruit nearly globose, 1-seeded.

1. **L. borealis, L.** TWIN-FLOWER. A beautiful, delicate plant. Corolla pale pink, very fragrant. Moist woods, in moss, and cold bogs N.

V. TRIOSTEUM, L.

Coarse, hairy, perennial herbs. Leaves large, those of each pair somewhat joined at the base, so that the stem appears to rise through them. Calyx-tube ovoid; divisions of the limb leaf-like, lance-linear, persistent. Corolla knobbed at the base, nearly equally 5-lobed. Ovary usually 3-celled, ripening into a stone-fruit with 3 nutlets.

1. **T. perfoliatum, L.** TINKER-WEED, WILD COFFEE, FEVERWORT, HORSE-GENTIAN. Stem unbranched, soft-hairy, 2–4 ft. high. Leaves spatulate-ovate, abruptly narrowed at the base, 4–7 in. long and 2–4 in. wide, bordered with a fringe of hairs. Flowers dark brownish-purple. Corolla about ½ in. long, sticky-downy. Fruit ellipsoidal, orange-colored when ripe. Common along fence-rows and in rocky woods.

VI. LONICERA, L.

Shrubs or woody vines. Leaves simple, usually entire, those of a pair often appearing as if joined together at the base, so that the stem seems to rise through them. Calyx-tube ovoid, 5-toothed. Corolla tubular to bell-shaped, often knobbed at the base or 2-lipped. Stamens 5. Ovary 2–3-celled, ovules several in each cell; style slender, stigma knobbed. Fruit a 1–3-celled, 1–few-seeded berry.*

A.

Stems twining.

1. **L. Sullivantii, Gray.** YELLOW HONEYSUCKLE. Stem somewhat twining. Leaves oval to obovate, obtuse, entire, green above, with a bloom beneath, the lower short-petioled, the upper sessile or joined at the base. Flowers in crowded, terminal whorls, bright yellow, fragrant. Corolla-tube slender, 1–1½ in. long, bilabiate, 4-lobed, pubescent within. Stamens and style projecting. On river banks and hillsides; often cultivated.*

2. **L. sempervirens, L.** CORAL HONEYSUCKLE, TRUMPET HONEYSUCKLE. Stem twining high. Leaves evergreen (in the South), oval to oblong, obtuse, entire, smooth above, pale and often downy beneath, the lower petioled, the upper pair nearly semi-orbicular and joined at the base. Flowering spikes terminal, bearing several whorls. Corolla about 2 in. long, slender, smooth, the limb short, nearly equally 5-lobed, scarlet without, bright yellow within. Stamens slightly projecting; fruit red. On low ground; often cultivated.*

3. **L. japonica, Thunb.** JAPAN HONEYSUCKLE. Stem twining high; young branches downy. Leaves ovate to oblong, entire, smooth above, pale and downy beneath, all short-petioled; peduncles axillary, 2-bracted, 2-flowered; flowers white or pink, fading to yellow, 2-lipped, the lips nearly as long as the downy tube. Stamens and style projecting. Fruit black. Introduced from Japan; common in cultivation.*

4. **L. Caprifolium, L.** EUROPEAN HONEYSUCKLE. A moderately high-climbing shrub. Leaves smooth and deciduous, several of the upper pairs united at their bases to form a flattish disk or somewhat cup-shaped leaf. Flowers in a single terminal whorl, very sweet-scented. Corolla whitish, red, or yellow, 2-lipped, with the lips recurved. Cultivated from Europe.

B.

More or less upright bushes, not climbing.

5. **L. tatarica, L.** TARTARIAN HONEYSUCKLE. A branching shrub, 5–8 ft. high. Leaves oval or ovate, heart-shaped, shining. Flowers many, showy, rose-colored. Fruit consisting of 2 red berries; somewhat united below at maturity. Cultivated from Asia.

6. **L. ciliata, Muhl.** EARLY FLY HONEYSUCKLE. A straggling bush, 3–5 ft. high. Leaves ovate or oval, slightly heart-shaped, thin, at first downy beneath. Flowers straw-yellow, on short, slender peduncles. Corolla-lobes nearly equal; tube pouched at the base. Fruit, 2 separate red berries.

VII. DIERVILLA, Tourn.

Low, upright shrubs. Leaves taper-pointed, serrate. Flowers in loose terminal or axillary clusters or cymes. Calyx with a limb of 5 linear divisions. Corolla funnel-shaped, almost regularly 5-lobed. Stamens 5. Ovary slender, 2-celled, ripening into a 2-valved, many-seeded pod.

1. **D. trifida, Moench.** COMMON BUSH HONEYSUCKLE. Bushy, 1–4 ft. high. Leaves ovate or oblong-ovate, petioled. Peduncles 1–3-flowered. Pods tapering to a slender point. Rocks, especially N.

2. **D. japonica, Thunb.** WEIGELA. A stout, branching shrub, 3–6 ft. high. Leaves broadly oval, acute at the apex, rounded at the base, coarsely serrate, rough above, downy beneath, short-petioled. Flowers spreading, funnel-form, rose-color, 1–1½ in. long. Calyx-lobes deciduous. Corolla downy without, the lobes spreading. Capsule oblong or spindle-shaped. Seeds with netted wings. Introduced from Japan; common in cultivation.*

97. VALERIANACEÆ. VALERIAN FAMILY.

Herbs, rarely shrubs. Leaves opposite, without stipules. Flowers small, usually irregular, in forking cymes. Calyx-tube adnate to the ovary. Corolla funnel-shaped, the base often with a sac or spur. Stamens 1–3 or 5, inserted at the base of the corolla-tube; filaments slender, anthers versatile. Ovary cells 3, two of them not ovule-bearing, the third with a single ovule hanging from the top; style thread-like, stigma blunt or 2–3-lobed. Fruit small, not splitting open.

I. VALERIANA, L.

Perennial, rarely annual, herbs. Root-leaves crowded; stem-leaves opposite or whorled, entire or pinnately cut. Flowers in corymbed, headed, or panicled cymes. Limb of the calyx consisting of several plumy bristles. Lobes of the corolla 5 or rarely 3–4, unequal. Stamens 3. Stigma knobbed. Fruit flattened, ribbed, 1-celled, 1-seeded.

1. **V. edulis, Nutt.** An upright, straight-stemmed plant, 1–4 ft. high. Leaves all thickish and closely fringed with short hairs; root-leaves linear-spatulate or lanceolate-spatulate, entire; stem-leaves pinnately parted, the 3–7 divisions long and narrow. Flowers almost diœcious, in a long, interrupted panicle. Corolla whitish. Root long and stout, eaten by Indians. Low ground and wet prairies, especially N. W.

2. **V. officinalis, L.** GARDEN VALERIAN. Plant smooth or hairy below, strong-smelling. Rootstock short. Leaves all pinnate; root-

leaves long-petioled, soon withering; stem-leaves 2–5 in. long, sessile, the leaflets lanceolate, entire or serrate. Corolla pale pink. Rootstocks strong-scented, used in medicine. Cultivated from Europe.

II. VALERIANELLA, Tourn.

Annual herbs; stem forking regularly. Leaves opposite, entire or dentate. Flowers in crowded, terminal, bracted cymes. Calyx-limb toothed or wanting. Corolla white or purplish, funnel-form, 5-lobed. Stamens 3. Style 3-lobed. Fruit 3-celled, 1-seeded.*

1. **V. olitoria, Poll.** LAMB LETTUCE. Stem erect, smooth, or downy at the nodes, many times forked, 9–12 in. high. Basal leaves tufted, spatulate to obovate, entire, the upper lanceolate, dentate, sessile. Cymes short-peduncled, bracts linear. Flowers pale blue. Fruit compressed, oblique. On rich soil in waste places.*

2. **V. radiata, Dufr.** CORN SALAD. Stem erect, smooth above, downy below, 2–4 times forked, 8–12 in. high. Lower leaves spatulate, entire, the upper lanceolate, clasping at the base, dentate. Cymes compact; bracts lanceolate. Flowers white. Fruit ovoid, downy, furrowed. On damp soil.*

98. CUCURBITACEÆ. GOURD FAMILY.

Somewhat succulent, tendril-bearing, prostrate or climbing, herbaceous plants. Leaves alternate, with stipules. Flowers dicœcious or moncœcious, often gamopetalous. Calyx-tube adnate to the ovary; calyx-limb (if present) 5-lobed. Corolla usually 5-lobed and with its tube more or less united with the calyx-tube. Stamens perigynous or borne upon the corolla, the anthers usually joined in long, serpentine ridges. Ovary 3-celled; stigmas 2 or 3. Fruit generally a pepo (like the melon, squash, and pumpkin), but sometimes dry. Seeds commonly large and flat. A large family, mostly of tropical plants, many with eatable fruit, but some species poisonous.

I. CUCURBITA, L.

Annual or perennial herbs; stem trailing or climbing, 2–20 ft. long. Leaves angular-lobed; tendrils branching. Flowers monœcious, solitary or in small clusters. Calyx 5-toothed, the limb deciduous. Corolla bell-shaped, 5-lobed. Staminate flowers with 3 stamens and no pistil; pistillate flowers with 1 pistil and 3 imperfect stamens. Style short; stigmas 3–5, each 2-lobed. Fruit 1-celled, with numerous seeds on the 3 parietal placentæ.*

1. **C. Melopepo, L.** SUMMER SQUASH. Stem rough-hairy, angled, 2–5 ft. long. Leaves broadly heart-shaped, angularly 3–5-lobed, rough. Flowers yellow, short-peduncled. Fruit roundish, longitudinally compressed, the margin smooth, wavy, or tubercular. Common in cultivation.*

2. **C. verrucosa, L.** CROOKNECK SQUASH. Stem rough-hairy, angled and striate, 5–10 ft. long. Leaves cordate, deeply 5-lobed, very rough, long-petioled. Flowers light yellow, long-peduncled. Fruit clavate, the base often slender and curved, smooth or tuberculate, very variable. Common in cultivation.*

II. CUCUMIS, L.

Annual herbs; stems trailing, usually shorter and more slender than in the preceding genus. Tendrils not forked. Leaves varying from entire or nearly so to deeply cut. Sterile flowers in clusters, fertile ones solitary in the leaf-axils. Corolla of 5 acute petals, which are but little joined at the base. Stamens not evidently united. Style short; stigmas 3, each 2-lobed. Fruit rather long. Seeds not large, lance-oblong, not margined.

1. **C. sativus, L.** CUCUMBER. Leaves somewhat lobed, the middle lobe largest. Fruit more or less covered when young with rather brittle, blackish prickles, which fall off as it ripens. Cultivated from S. Asia. [Other varieties of the genus *Cucumis* are the muskmelon, cantaloupe, and nutmeg melon. Other commonly cultivated genera are *Citrullus*, the watermelon, and *Lagenaria*, the bottle-gourd. Two wild genera, *Echinocystis*, the wild cucumber, and *Sicyos*, the star cucumber, which blossom through the summer and autumn, are common in the Northern States and the Middle West.]

99. CAMPANULACEÆ. Campanula Family.

Herbs, with milky juice. Leaves alternate, without stipules. Flowers regular, not clustered. Calyx 5-lobed, adnate to the ovary. Corolla regular, bell-shaped, 5-lobed. Stamens 5, usually free from the corolla and not coherent. Style 1, usually hairy above; stigmas 2 or more. Fruit a capsule, 2 or more celled, many-seeded.

I. CAMPANULA, Tourn.

Annual, biennial, or perennial herbs. Flowers solitary, racemed or spiked, regular, blue or white. Calyx 5-lobed or parted. Corolla wheel-shaped to bell-shaped, 5-lobed. Stamens 5, free from the corolla, distinct, filaments dilated at the base. Ovary 3–5-celled, many-ovuled; style 3-parted. Capsule short, bearing the persistent calyx-lobes at its apex, many-seeded, splitting open on the sides.*

1. **C. rotundifolia, L.** Harebell. A slender, smooth, branching perennial, 5–12 in. high. Root-leaves broadly ovate-heart-shaped, generally somewhat crenate, soon withering. Stem-leaves varying from linear to narrowly lanceolate, entire. Pedicels slender. flowers solitary or somewhat racemed, the buds erect but the fully opened flower drooping. Calyx-teeth erect, awl-shaped. Corolla bell-shaped, ½–1 in. long, its lobes short and recurved. Rocky hillsides, especially N.

2. **C. aparinoides, Pursh.** Marsh Bell-flower. Stem angular, unbranched, slender, weak and leaning on the grass among which it usually grows, the angles clothed with minute, backward-pointing prickles. Leaves lance-linear, nearly entire. Flowers terminal, about ¼ in. long, white. Corolla bell-shaped. Wet meadows, in tall grass.

II. SPECULARIA, Heister.

Annual; stems slender, angled. Leaves entire or toothed. Flowers axillary, regular, solitary or in small clusters, sessile, bracted. Calyx-tube slender, 3–5-parted. Corolla wheel-shaped, 5-lobed. Stamens with the filaments flattened and shorter than the anthers. Ovary 3-celled, many-ovuled; stigmas 3. Fruit a prismatic, 3-celled, many-seeded capsule.*

1. **S. perfoliata, A. DC.** SPECULARIA. Stem erect, simple or branched from the base, angles roughened, 10–20 in. high. Leaves ovate to lanceolate, acute at the apex, sessile, crenate or entire, the upper bract-like. Flowers solitary or in pairs. Corolla blue, often wanting. Capsule cylindrical, smaller above. In waste places.*

100. COMPOSITÆ. COMPOSITE FAMILY.

Flowers in a dense head, on a common receptacle, surrounded by an involucre composed of many bracts (Fig. 22),

FIG. 22. — Flower-cluster of Bachelor's Button (*Centaurea Cyanus*).

with usually 5 stamens inserted on the corolla, the anthers united into a tube which surrounds the style (Fig. 23, V). Calyx with its tube adnate to the ovary, the limb sometimes wanting, when present taking the form of scales, bristles, etc., known as *pappus* (Fig. 24, II, III). Corolla either strap-shaped (Fig. 25, *r*) or tubular (Fig. 23, V), in the former case

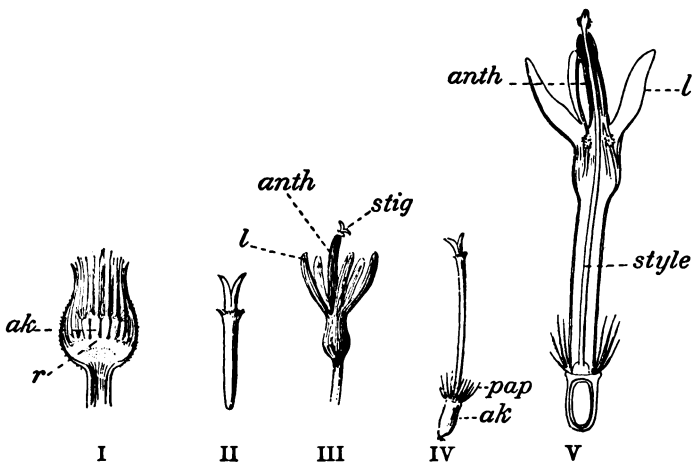


FIG. 23. — Bachelor's Button.

I, vertical section of the receptacle; II, style and forked stigma (magnified); III, corolla, united anthers and stigma (magnified); IV, pistil (magnified); *pap*, pappus; *ak*, akene; V, tubular flower cut vertically (magnified), showing anther-tube, traversed by the style; *l*, lobe of corolla.

often 5-toothed, in the latter usually 5-lobed. Style 2-cleft above. Fruit an akene, often provided with means of transportation (Part II, Ch. XXIX). The largest family of flowering plants and among the most specialized for insect pollination. The genera of the northern United States are divided into two suborders: I. TUBULIFLORÆ, corolla of the perfect flowers tubular and 5-lobed; II. LIGULIFLORÆ, corollas all strap-shaped and flowers all perfect.

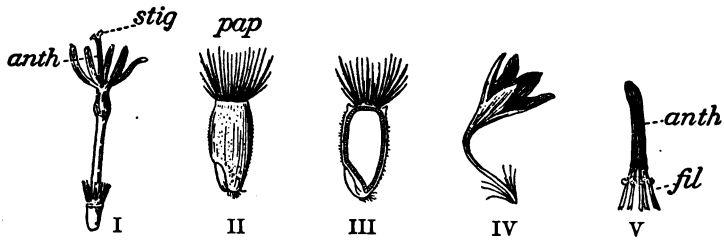


FIG. 24. — Bachelor's Button.

I, a tubular flower (magnified); *anth*, the united anthers; II, fruit (magnified); III, fruit, vertical section (magnified); IV, a neutral ray-flower;[1] V, ring of anthers.

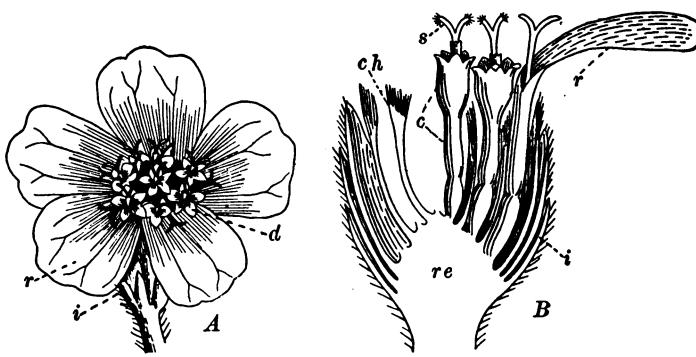


FIG. 25. — Flower-cluster of Yarrow (*Achillea Millefolium*), enlarged.

A, head seen from above; *B*, longitudinal section; *re*, receptacle; *ch*, chaff; *i*, involucre; *r*, ray-flowers; *d*, disk-flowers; *c*, corolla; *s*, stigma.

[1] This is not precisely homologous with the ray-flowers of *Helianthus* and most rayed Compositæ, but is an enlarged and conspicuous tubular flower.

I. TUBULIFLORÆ.

A.[1]

Corollas some or all of them tubular.

Rays white, pink, or purplish.

Rays many; akenes flat; pappus wanting; low herbs. Bellis, I.

Rays many; akenes cylindrical or winged, grooved; pappus wanting; tall herbs or shrubby. Chrysanthemum, VIII.

Rays many; akenes flat; pappus of an outer row of minute scales and an inner row of delicate bristles. Erigeron, II.

Rays many; akenes cylindrical or ribbed; pappus wanting; strong-scented branching herbs. Anthemis, VI.

Rays few. Achillea, VII.

Rays yellow.

Disk purplish-brown. Rudbeckia, IV.

Disk yellow.

Involucre of 2 rows of bracts, the outer rather leaf-like. Coreopsis, III.

Involucre of reflexed scales; pappus of 5–8 scales. Helenium, V.

Involucre of erect scales; pappus of abundant soft hairs. Senecio, IX.

Rays none, but the marginal flowers sterile and their tubular corollas partly flattened like rays (Fig. 24). Centaurea, X.

Rays none and marginal flowers like the others; scales of the involucre overlapping in many rows, prickly-pointed. Cirsium, XI.

B.

Corollas all strap-shaped.

Corollas blue (rarely pinkish); akenes not beaked. Cichorium, XIII.

Corollas blue; akenes beaked. Lactuca, XVIII.

[1] The characters in this key are not necessarily true of all species in the genera referred to, but only of those described below.

Corollas yellow.

Akenes truncate; pappus double, of chaff and bristles. Krigia, XII.

Akenes columnar; pappus of tawny, rough bristles; stem scape-like. Hieracium, XIV.

Akenes spindle-shaped, not beaked; pappus of plumed bristles. Leontodon, XV.

Akenes ovoid to spindle-shaped, long-beaked; pappus white, soft, and abundant. Taraxacum, XVI.

Akenes nearly as in XVI; pappus tawny. Pyrrhopappus, XVII.

Akenes flattened, beaked; pappus soft, white, the hairs soon falling off separately; leafy-stemmed herbs. Lactuca, XVIII.

Akenes flattened, not beaked; pappus abundant, soft, white; leafy-stemmed, spiny-leaved herbs. Sonchus, XIX.

I. BELLIS, L.

Small herbs. Leaves usually all radical, petioled. Heads solitary, disk yellow, ray-flowers white or pink; involucre bell-shaped, bracts in 1 or 2 rows, green; receptacle conical. Ray-flowers many, in a single row, pistillate. Disk-flowers tubular, perfect, 4–5-toothed; forks of the style short, thick, tipped by roughened cones. Fruit flattened, obovate; pappus wanting.

1. **B. integrifolia, Michx.** AMERICAN DAISY. A branching annual or biennial herb, 4–12 in. high. Upper leaves lanceolate or oblong, the lower ones obovate-spatulate. Heads borne on slender peduncles; rays violet-purple. Prairies, especially S.W.

2. **B. perennis, L.** ENGLISH DAISY, SCOTCH DAISY. A stemless perennial. Leaves obovate-spatulate, smooth or hairy. Heads $\frac{3}{4}$–1 in. in diameter, very pretty, the rays delicate. Cultivated from Europe.

II. ERIGERON, L.

Herbs. Leaves usually sessile. Heads many-flowered, flat or nearly hemispherical, the rays numerous, narrow, pistillate. Scales of the involucre narrow and overlapping but little.

Akenes flattish, crowned with a single row of hair-like bristles, or sometimes with shorter bristles or scales outside these. Disk yellow, rays white, pinkish, or purple.

1. **E. annuus, Pers.** COMMON FLEABANE. Annual or biennial. Stem grooved and stout, branching, 2–5 ft. high, with scattered hairs; lowest leaves petioled, ovate, coarsely toothed, those higher up the stem successively narrower, sessile; heads in a large loose corymb; rays short, white or purplish. Fields and waste ground.

2. **E. strigosus, Muhl.** DAISY FLEABANE. Annual or biennial. Considerably resembling the preceding species, but with entire leaves, smaller and less branched stem, smaller heads, and longer rays. Fields and pastures.

3. **E. bellidifolius, Muhl.** ROBIN'S PLANTAIN. Perennial. Soft-hairy; stems sometimes throwing out offsets from the base; simple, erect, 1–2 ft. high; root-leaves, obovate-obtuse, somewhat serrate; stem-leaves few, lance-oblong, acute, clasping; heads rather large, 1–9, on long peduncles, with 50–60 long, rather broad, bluish-purple or reddish-purple rays. Thickets and moist banks.

4. **E. philadelphicus, L.** Perennial. Rather hairy; stems slender, about 2 ft. high; root-leaves spatulate and toothed; stem-leaves usually entire and strongly clasping, sometimes with a heart-shaped or eared base; heads several, small, long-petioled; rays exceedingly numerous, thread-like, reddish-purple or flesh-color. In damp soil.

III. COREOPSIS, L.

Annual or perennial herbs. Leaves opposite or the upper alternate, entire or pinnately divided. Heads radiate, solitary or corymbed, many-flowered; bracts in 2 rows of about 8 each, the inner membranaceous and appressed, the outer narrower and spreading; receptacle chaffy. Ray-flowers neutral; disk-flowers tubular, perfect. Akenes compressed, oval to oblong, often winged. Pappus of 2 scales or bristles, or wanting.*

1. **C. tinctoria, Nutt.** GARDEN COREOPSIS. Annual. Stem erect, smooth, branched, 2–3 ft. high. Leaves 2–3 times pinnately divided, the divisions linear, lower leaves petioled, the upper often sessile and entire. Heads 1–1½ in. wide, on slender peduncles; inner bracts brown with scarious margins, outer bracts very short. Ray-flowers about 8, yellow with a brown base, 3-lobed at the apex. Akenes linear. Pappus minute or none. Common in gardens.*

2. **C. lanceolata, L.** TICKSEED. Perennial; stem slender, erect or ascending, smooth or slightly downy below, simple, 9–15 in. high. Leaves opposite, the lower spatulate to elliptical, sometimes lobed,

on long, hairy-fringed petioles, the upper lanceolate, sessile. Heads few, on long peduncles; bracts ovate-lanceolate, the outer narrower. Ray-flowers 6–10, rays 3–5-lobed, bright yellow. Akenes oval, broadly winged, warty. Pappus of 2 teeth. On rich, dry soil S. and E.*

3. **C. auriculata, L.** RUNNING TICKSEED. Perennial; stem ascending or decumbent, weak, smooth, nearly simple, 6–15 in. long. Leaves ovate to oval, entire or with 2–4 small and rounded lobes at the base, downy, long-petioled. Heads 1–1½ in. wide, few or single; outer bracts narrower than the inner. Rays 6–10, mostly 4-toothed at the apex; chaff as long as the flowers. Akenes oblong, the wings narrow and thickened. Pappus of 2 minute teeth. In rich woods.*

IV. RUDBECKIA, L.

Perennial or biennial. Leaves alternate, entire or lobed. Heads radiate, long-peduncled, many-flowered; bracts imbricated in 2–3 series, spreading; receptacle convex or long-conical, with concave, chaffy scales. Ray-flowers yellow, neutral; disk-flowers purple to brown, perfect. Akenes smooth, 4-angled, truncate. Pappus a few short teeth or wanting.*

1. **R. hirta, L.** CONE-FLOWER. Annual or biennial; stem erect, rough-hairy, simple or branched, 2–3 ft. high. Leaves lanceolate to oblong, thick, obscurely serrate, rough-hairy, 3-ribbed, the lower petioled, the upper sessile. Heads few, long-peduncled; bracts rough-hairy, spreading. Ray-flowers 10–20, orange-yellow; disk-flowers purplish brown. Chaff acute, hairy at the apex. Pappus none. On dry, open ground.

V. HELENIUM, L.

Annual or perennial. Leaves alternate, forming wings on the stem. Heads radiate, peduncled, many-flowered; bracts in 2 series, the outer linear and spreading, the inner few and scale-like; receptacle naked, convex or oblong. Ray-flowers pistillate and fertile, or neutral, the rays wedge-shaped, 3–5-lobed; disk-flowers perfect, tubular, 4–5-lobed. Akenes top-shaped, hairy, ribbed. Pappus of 4–5 entire, toothed or awned scales.*

1. **H. nudiflorum, Nutt.** SNEEZEWEED. Perennial; stem slender, erect, downy, branched above, 1–2 ft. high. Leaves lanceolate, entire or slightly toothed, the lower petioled, the upper sessile.

Heads numerous. Ray-flowers 10–15, neutral, yellow or yellow and brown; disk-flowers purple. Akenes hairy on the ribs; pappus of ovate, minutely toothed, awned scales. Common on river banks S.*

VI. ANTHEMIS, L.

Aromatic or ill-scented herbs. Leaves finely pinnately divided. Heads many-flowered, with ray-flowers. Rays pistillate or neutral. Involucre of many small, dry, close-pressed scales. Akenes nearly cylindrical, generally ribbed; barely crowned or naked at the summit.

1. **A. Cotula, DC.** MAYWEED, DOG-FENNEL. Leaves irregularly cut into very many narrow segments. Heads small, produced all summer. Disk yellow. Rays rather short, white, neutral. A low, offensive-smelling annual weed, by roadsides and in barnyards.

VII. ACHILLEA, L.

Perennial; leaves alternate, pinnately divided. Heads with ray-flowers in a terminal corymb; involucral bracts imbricated in several series, the outer shorter; receptacle chaffy. Ray-flowers white or pink, pistillate and fertile; disk-flowers perfect, tubular, 5-lobed. Akenes oblong, compressed, slightly margined. Pappus none.*

1. **A. Millefolium, L.** YARROW. Stems often clustered, erect from a creeping rootstock, simple, downy or woolly, 1–2 ft. high. Leaves lanceolate or oblong, the segments finely cut and divided, smooth or downy, the lower petioled, the upper sessile. Heads small, numerous, in flat-topped corymbs; bracts downy. Ray-flowers 4–5, white or pink, rays 3-lobed at the apex. Common in old fields.*

VIII. CHRYSANTHEMUM, Tourn.

Perennials, with toothed, pinnately cut or divided leaves. Heads nearly as in the *Anthemis*, except that the ray-flowers are pistillate.

1. **C. Leucanthemum, L.** OXEYE DAISY, WHITEWEED, BULL'S-EYE, SHERIFF PINK. Stem erect, unbranched or nearly so, 1–2 ft. high; root-leaves oblong-spatulate, petioled, deeply and irregularly toothed; stem-leaves sessile and clasping, toothed and cut, the uppermost ones shading off into bracts. Heads terminal and solitary,

large and showy, with a yellow disk and many white rays. A troublesome but handsome perennial weed. Introduced from Europe, chiefly E.

2. **C. frutescens, L.** MARGUERITE. Erect, branching, perennial, woody below, smooth, and with a pale bloom. Divisions of the leaves linear, with the uppermost leaves often merely 3-cleft bracts. Heads long-peduncled, showy, with a yellow disk and large, spreading white rays. Cultivated in greenhouses; from the Canary Islands.

IX. SENECIO, Tourn.

Annual or perennial; stems often hollow. Leaves alternate, entire or pinnately divided. Heads with or without rays, in terminal corymbs; bracts mostly in a single row, often with a few shorter ones at the base; receptacle naked or pitted. Ray-flowers yellow or orange, pistillate and fertile when present; disk-flowers tubular, perfect. Akenes cylindrical or compressed, not beaked or winged, 5–10-ribbed, downy. Pappus of numerous, slender, white hairs.*

1. **S. tomentosus, Michx.** WOOLLY RAGWEED. Perennial; woolly throughout; stem stout, erect, mostly simple, 2–3 ft. high. Lower leaves ovate to oblong, crenate or entire, obtuse, long-petioled; stem-leaves few, elliptical to oblanceolate, serrate or toothed, acute, sessile. Heads radiate, $\frac{3}{4}$ in. wide, on slender peduncles; bracts narrow, becoming smooth. Ray-flowers 12–15, yellow. Akenes hairy. On damp soil.*

2. **S. aureus, L.** GOLDEN RAGWEED. Perennial; stems often tufted, erect, slender, woolly when young, branched above, 18–30 in. high. Lower leaves broadly ovate, obtuse at the apex, heart-shaped at the base, crenate, long-petioled; stem-leaves lanceolate and often pinnatifid, the upper small and sessile. Heads radiate, corymbed, on slender peduncles; ray-flowers 8–12, bright yellow. Akenes smooth. On wet soil; very variable.*

3. **S. lobatus, Pers.** BUTTERWEED. Annual; stem erect, ridged, hollow, often woolly when young, and becoming smooth with age, branched above, 1–3 ft. high. Leaves lyrate-pinnatifid, thin, the lower petioled, the upper sessile. Heads radiate in a terminal corymb; bracts linear, acute. Ray-flowers about 12, yellow. Akenes slightly rough-hairy on the angles. Pappus rough, longer than the involucre. Common on low ground.*

X. CENTAUREA, L.

Herbs. Leaves entire or cut, often spiny-toothed. Heads single; involucre ovoid or globose (Fig. 22); bracts closely overlapping, entire, dry and membranaceous. Corollas all tubular, oblique or 2-lipped, inflated above; the outer ones usually larger and neutral, the inner flowers perfect; lobes 5, slender. Akenes flattened. Pappus hairs short, slender, rough.

1. **C. Cyanus, L.** BACHELOR'S BUTTON. Stem erect, slender, grooved, 1–2 ft. high, somewhat branched. Leaves acute, sessile, narrow, entire or few-lobed. Peduncles covered with cottony wool. Heads ½–1 in. in diameter, cobwebby. Ray-like flowers few, large, bright blue or pink; those of the disk smaller. Cultivated from Europe and escaped from gardens.

XI. CIRSIUM, Tourn.

Biennial or perennial; stem erect, simple or branched. Leaves alternate, prickly, often forming wings on the stem. Heads discoid, terminal and solitary or corymbed, many-flowered; bracts overlapping in many series, the outer shorter, usually spine-pointed; receptacle bristly. Corollas purplish or nearly white, the tube slender, deeply 5-cleft. Akenes oblong, 4-angled, smooth or ribbed. Pappus of numerous simple or plumose bristles.*

1. **C. altissimum, Spreng.** TALL THISTLE. Perennial or biennial; stem stout, very leafy, downy or woolly, branched 4–10 ft. high; leaves rough-downy above, hoary beneath, fringed with fine prickles, not forming wings on the stem, the lower petioled and often pinnately cut, the upper sessile and entire. Heads ovoid, 1 in. in diameter; bracts viscid, webby when young, all except the inner ones tipped with weak and spreading bristles. Flowers light purple. Common in fields, woods, and waste places.*

2. **C. horridulum, Michx.** YELLOW THISTLE. Biennial or perennial; stem erect, stout, woolly when young, becoming smooth, often purple, branched 1–3 ft. high. Leaves pinnately cut, with very spiny teeth, mostly sessile and clasping, smooth and green on both sides. Heads large, surrounded by a whorl of linear-oblong, comb-like leaves; involucral bracts linear, ciliate, not spine-tipped. Flowers purple or yellowish. On sandy soil E. and S.*

II. LIGULIFLORÆ.

XII. KRIGIA, Schreber.

Small, annual or perennial herb. Leaves mostly radical, toothed or lyrate. Heads several–many-flowered; scales of the involucre about 2-rowed, thin. Akenes short, truncate. Pappus in 2 rows, the outer one of thin, blunt, chaffy scales, the inner one of slender bristles. Corollas yellow.

1. **K. virginica, Willd.** Annual; scapes usually 2–5 from one root, slender. Leaves mostly lyrate, smooth and with a bloom, the earlier ones rounded or spatulate. Scales of the involucre linear-lanceolate, nearly equal, spreading. Akenes top-shaped, reddish-brown, crowned with 5 wedge-obovate scales and 5 rough white bristles.

2. **K. Dandelion, Nutt.** Perennial, from slender tuber-bearing roots. Scapes leafless, 6–18 in. high. Leaves entire or nearly so, varying from spatulate-oblong to linear-lanceolate. Akenes more slender than in No. 1. Pappus consisting of 10–15 small, oblong, chaffy scales and 15–20 bristles. In moist ground, especially S.

3. **K. amplexicaulis, Nutt.** Stem 12–18 in. high, often 2–3 from the same root, mostly 2-forked or 3-forked at the summit. Root-leaves 3–6 in. long, lanceolate, entire, toothed or rarely pinnately cut, clasping at the base; stem-leaves 1–3. Akenes and pappus about as in No. 2. Moist banks.

XIII. CICHORIUM, L.

Perennial herbs with spreading branches; juice milky. Leaves radical and alternate, toothed or pinnately cut. Heads axillary; involucre cylindrical, bracts in 2 rows, the inner row erect, coherent at the base, the outer shorter; receptacle flattish. Corollas blue, pale pink, or yellow. Upper part of the style and its slender arms hairy. Akenes crowded on the hardened receptacle, firmly covered by the stiff involucre, obovoid or top-shaped, not beaked. Pappus 1 or 2 rows of short scales.

1. **C. Intybus, L.** CHICORY, BLUE DANDELION, BLUE SAILORS. Root very long, stout, and fleshy. Stem 1–3 ft. high, angled and grooved; branches straight and stiff. Root-leaves and lower stem-leaves runcinate; upper stem-leaves oblong or lanceolate, clasping,

those of the branches reduced to bracts. Flowers very showy, usually bright blue, rarely pinkish-white. Introduced from Europe; a troublesome weed in grass-lands and common in waste places, particularly in New England.

XIV. HIERACIUM, L.

Perennial herbs, often covered with glandular or star-shaped hairs; juice milky. Leaves alternate. Heads solitary, or in corymbs or panicles; bracts of the involucre many, overlapping, unequal; receptacle flattish, naked, pitted. Corollas yellow, rarely orange; arms of the style slender and upper part of the style hairy. Akenes angled or grooved, not beaked. Pappus hairs in a single row, simple, stiff, tawny, or brownish, brittle.

1. **H. venosum, L.** RATTLESNAKE WEED. Stem scape-like, usually leafless or nearly so, smooth, 1–2 ft. high. Root-leaves 2–5 in. long, obovate or ovate-oblong, generally purple-veined. Heads rather large, yellow, in a loose panicled corymb. Dry hills and roadsides, and in pine woods E.

XV. LEONTODON, L.

Perennial, scape-bearing herbs; juice milky. Leaves all radical, toothed or pinnatifid, often runcinate. Heads on simple or branched scapes, yellow; bracts of the involucre many, in several rows, the anther smaller; receptacle flat, naked. Arms of the style linear, obtuse, hairy. Akenes cylindrical, grooved, transversely wrinkled; beak short; pappus hairs stiff, in 1 or 2 rows.

1. **L. autumnalis, L.** Scape usually branching, 5–15 in. high, bracted; peduncles enlarged above. Rootstock truncate. Heads 1½–1 in. or more in diameter; involucre top-shaped or bell-shaped. Pappus of a single row of tawny hairs. Fields and roadsides, especially N. E. Introduced from Europe.

XVI. TARAXACUM, Haller.

Stemless, perennial or biennial herbs. Leaves in a flattish tuft, pinnately cut or runcinate (Fig. 38). Head many-flowered, large, solitary, yellow, borne on a hollow scape, which

is short at first but lengthens after flowering. Involucre composed of a single row of long, erect, inner scales and a set of much shorter ones outside and at the base of the former ones. Akenes cylindrical or spindle-shaped, with 4–5 rough ribs, the apex tapering into a bristle-like beak which bears a short, broadly conical tuft of soft white hairs.

1. **T. officinale, Weber.** DANDELION. Outer involucre reflexed; inner involucre closing over the head, after the flowers are withered, and remaining shut for some days, then opening and allowing the akenes to form a globular head. Root stout, bitter, medicinal. Young leaves eaten as a pot-herb ("greens") in spring — the plant often cultivated for the leaves by market-gardeners.

XVII. PYRRHOPAPPUS, DC.

Annual or biennial; stem erect, leafy below, nearly naked above, smooth. Leaves oblong, toothed or pinnatifid. Heads large, long-peduncled; involucre cylindrical or spreading, the inner row of bracts erect, united at the base, the outer rows shorter and spreading; receptacle naked. Flowers yellow; rays truncate, 5-toothed at the apex. Akenes oblong, 5-ribbed, narrowed above into a long and slender beak; pappus soft, tawny, with a short, soft-hairy ring at the base.*

1. **P. carolinianus, DC.** FALSE DANDELION. Annual or biennial; stem glabrous, furrowed, branched above, 2–3 ft. high. Lower leaves lanceolate to oblong, entire, toothed or pinnatifid, narrowed into a margined petiole, the upper sessile, bract-like, entire. Heads few, long-peduncled, peduncles and involucre sometimes finely downy; inner bracts calloused at the apex, the outer awl-shaped and spreading. Akenes much shorter than the thread-like beak. Common in fields.*

XVIII. LACTUCA, Tourn.

Annual, biennial, or perennial; stems leafy. Leaves entire to pinnately cut. Heads panicled; involucre cylindrical, bracts unequal, overlapping in 2 or more rows, the outer shorter; receptacle naked. Flowers blue, yellow, or white; rays truncate, 5-toothed at the apex. Akenes compressed, ribbed, the apex contracted into a slender beak, which is enlarged into a disk bearing the soft, hairy, white or tawny pappus.*

1. **L. canadensis, L.** WILD LETTUCE. Biennial; stem erect, smooth, hollow, branched above, 3–10 ft. high. Leaves lanceolate to spatulate, pale beneath, the lower petioled and pinnately cut, the upper sessile, clasping, and nearly entire. Heads numerous, about 20-flowered. Flowers yellow; akenes oval, flat, 1-ribbed on each side, minutely roughened, about as long as the beak. Pappus white. In waste places.*

2. **L. acuminata, Gray.** BLUE LETTUCE. Stem very leafy, smooth, paniculately branched above, 3–6 ft. high. Leaves ovate to lanceolate, taper-pointed, often hairy beneath, the lower on winged petioles and often sinuate-lobed, the upper sessile. Heads racemed, on divergent and bracted peduncles. Flowers blue. Akenes slightly compressed, beak very short. Pappus white. In waste places.*

XIX. SONCHUS, L.

Annual or perennial. Leaves mostly toothed or pinnately cut, prickly margined. Heads in corymbs or panicles; bracts in several series, the outer shorter; receptacle naked. Flowers yellow, rays truncate, 5-toothed at the apex. Akenes oval to oblong, compressed, ribbed, truncate at the apex. Pappus of numerous soft white hairs.*

1. **S. oleraceus, L.** SOW THISTLE. Annual; stem erect, branched, smooth, 2–6 ft. high. Leaves spiny-toothed, the lower long-petioled, very irregularly cut or pinnatifid, the upper clasping by an eared base. Involucre downy when young. Akenes channeled and transversely wrinkled. In waste places on very rich soil.*

2. **S. asper, Vill.** SPINY SOW THISTLE. Annual; stem erect, smooth, branched but little, 2–6 ft. high. Leaves undivided, spatulate to oblanceolate, fringed with spiny teeth, the lower narrowed into a petiole, the upper clasping by an eared base, the ears rounded. Heads numerous; involucre glabrous. Akenes flattened, margined, 3-nerved on each side, smooth. In waste places.*

GLOSSARY

OF TECHNICAL TERMS USED ONLY IN THE FLORA

Abortive, imperfectly developed.

Appressed, lying flat throughout its length, used of such parts as bracts.

Awl-shaped, narrow and tapering to a point.

Awned, having a bristle-like appendage.

Awnless, not awned.

Capitate, (1) having a round head like the stigma of a primrose; (2) growing in heads.

Carpellary, relating to a carpel.

Chaff, small membranous scales, such as are found on disks of *Compositæ*.

Clasping, partly surrounding the stem, said of the bases of leaves.

Claw, the narrowed base of a petal.

Cleft, cut halfway down.

Coated (bulbs), those with scales which completely cover them, as in the onion.

Cone, the fruit of pines, etc., with ovule-bearing scales.

Connate, united, said of opposite leaves which appear as if grown together at their bases.

Cordate, heart-shaped.

Corm, a bulb-like, fleshy stem or base of a stem.

Crown, an inner appendage to a petal or to the throat of the corolla.

Deciduous, falling as petals do after blossoming, or as leaves of most trees except evergreens do.

Declined, directed obliquely.

Decumbent, reclining, but with the summit somewhat erect.

Dehiscent, splitting into definite parts.

Diffuse, spreading widely or loosely.

Disk, (1) an outgrowth of the receptacle within the calyx or within the corolla and stamens; (2) the central part of the head (all but the rays) in *Compositæ*.

Dissected, deeply divided or cut into many segments.

Drupe, a stone-fruit such as a peach or a plum.

Equitant, *leaves astride of those within them*, thus appearing in a cross-section like the diagram, <<<.

Even-pinnate, abruptly pinnate, *i.e.*, with no leaflet at the end.

Fascicle, a close cluster or bundle of flowers, leaves, stems, or roots.

Fertile, capable of producing fruit; fertile flowers, those which have pistils.

Filiform, thread-shaped.

Fleshy, succulent, thick and full of sap.

Funiculus, the little stalk which connects a seed or ovule with the placenta.

Gland, (1) a structure which secretes something, as the knobs on the hairs of sundew; (2) any knob or swelling.

Herbaceous, with no stem aboveground which lives through the winter, not woody or shrubby.

Indefinite, too many to be easily counted.

Indehiscent, not splitting open regularly.

Involucrate, provided with an involucre.

Keel, the two anterior and united petals of a papilionaceous corolla.

Key, a winged fruit like that of the ash or maple.

Limb, the border or spreading part of a gamopetalous calyx or corolla.

Lobed, having divisions, especially rounded ones.

Nerved, having simple or unbranched veins or slender ribs.

Ob, in composition, signifies inversely, as obcordate, inversely heart-shaped.

Odd-pinnate, pinnate with a single leaflet at the end of the midrib.

Palate, a projection in the throat of a corolla.

Papilionaceous, butterfly-shaped, like the corolla of the sweet pea.

Papillose, covered with papillæ or minute projections, like the human tongue.

Pappus, tufts of hair or other objects, representing the limb of the calyx in *Compositæ*.

Perfoliate, with the stem apparently growing up through a leaf, as in some honeysuckles.

Persistent, not deciduous.

Pinnatifid, pinnately cleft.

Pistillate, having pistils but not stamens.

Pubescent, clothed with soft hair, downy.

Punctate, marked with dots, depressions, or translucent glands.

Radical, arising from the root or a very short stem at its summit, as the leaves of the dandelion.

Reflexed, bent or turned abruptly downward or backward.

Root-parasite, a plant parasitic on the roots of another.

Sagittate, arrow-shaped.

Scape, a leafless flower-stalk arising from the ground, as in the dandelion and cyclamen.

Scarious, thin, dry, and membranous, not green.

Sessile, without a stalk.

Simple (stem), unbranched.

Spadix, a spike with a fleshy axis, like that of the Indian turnip or the "calla."

Spathe, a large bract which encloses a flower-cluster, often a spadix.

Staminate, having stamens only.

Standard, the posterior petal of a papilionaceous corolla.

Sterile, (1) barren, as a flower without a pistil or an antherless stamen; (2) staminate or male, said of flowers.

Striate, marked with fine longitudinal parallel lines.

Sub- (in composition), somewhat, as subglobose.

Subtend, to extend beneath, as a bract in the axil of which a flower is borne.

Succulent, fleshy or juicy.

Three-ranked, with three vertical rows on a stem or axis.

Throat, the top of the tubular part of a gamopetalous corolla.

Truncate, appearing as if cut squarely off, as the leaves of the tulip-tree.

Tubercled, covered with warty growths.

Tubercular, having tubercles, or like a tubercle.

Two-ranked, with two vertical rows on a stem or axis.

Utricle, a small bladdery ovary-wall.

Versatile, turning freely on its support, as an anther on its filament.

Whorled, arranged in a circle around an axis, as the leaves of some lilies.

Wings, the side-petals of a papilionaceous flower.

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